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INDIA RUBBER WORLD

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Fluorescent Lighting for the Rubber Industry

O. P. Cleaver[1]

SINCE the introduction of the fluorescent lamp, all fields of applied lighting are being subjected to a process of analysis to determine just where this new light source may be used to advantage. The efficiency of light production attained in the fluorescent lamp has been the one feature which has probably been responsible for much of the interest in this new light source, but it is significant to note that it is usually one or more of the other characteristics of the lamp which have been responsible for most of the actual installations in industry. These characteristics are: daylight quality, linear shape, low brightness, and cool foot-candles.

Much confused thinking and misunderstanding have resulted from a natural tendency to regard the lamps as a serious rival of all other light sources simply because of their greater efficiency in lumens per watt. If the installation is one in which none of the four advantages mentioned above is of any special significance, the problem becomes one in the economics of lamp operation. In such installations a comparison between fluorescent and incandescent lamps, for example, may be made on a cost of light basis, and either one or the other may prove to be the more economical depending upon a number of factors which must be taken into account in a calculation of this kind. These include wiring, fixtures, lamps, and power. But cost is not everything. A higher cost, for example, may be well justified in cases where the color of light produced is a major consideration or where the relative coolness of operation of fluorescent lamps is an important factor.

Principle of Operation

Before entering into a discussion of the application of fluorescent lamps it may be well to review a few facts regarding the operating characteristics of the lamps and the control equipment which must be used with them.

The basis of the Mazda "F" fluorescent lamp is a low-pressure mercury vapor discharge which takes place between electrodes in each end of the tube. In order to permit low-voltage starting, these electrodes must be momentarily preheated during the starting period, and the lamp circuit must provide a means of doing this preheating and also a ballast to limit the value of the current in the lamp. The vapor discharge is weak in visible light, but contains a wealth of invisible ultra-violet radiations. The inside surface of the lamp is coated with certain chemical powders of phosphors, which have the property of converting these invisible radiations into visible light of a color depending on the characteristics of the phosphors used. The lamps are made in tubular form in lengths (including the sockets) of 18, 24, 36 and 48 inches and designed to consume 10 watts per linear foot.

Essential data on these various sizes are shown in the accompanying table which also gives the lumen output of the daylight and of white lamps which are of greatest interest for industrial applications. All of the lamps except the 40-watt 48-inch are available in five additional colors: blue, gold, green, pink, and red. These are intended principally for decorative lighting, and it is not expected that they will be found of much value in industry.

TABLE 1. ESSENTIAL TECHNICAL DATA, MAZDA "F" LAMPS

Watts (Nominal —Lamp Only)	15	15	20	30	40
Bulb	T-8	T-12	T-12	T-8	T-12
Nominal Length	18″	18″	24″	36″	48″
Base	Med. Bipin	Med. Bipin	Med. Bipin	Med. Bipin	Med. Bipin
Approximate Lamp Amperes	0.30	0.30	0.35	0.33	0.42
Approximate Lamp Volts	56	48	62	103	108
Max. Overall Length (Incl. Pins)	17-25/32″	17-25/32″	23-25/32″	35-25/32″	47-25/32″
Rated Avg. Lab. Life (Hours)	2500	2500	2500	2500	2500
Approximate Light Output, (Lumens):					
Daylight	495	495	760	1230	1800
White	585	585	900	1440	2120
Burning Position	Any	Any	Any	Any	Any

Mazda "F" lamps must be operated with special controls or ballasts designed to furnish the necessary starting voltage and maintain the proper operating current. Standard auxiliaries are available for operation on regular lighting circuits.

[1] Commercial Engineering Department, Westinghouse Lamp Division, Bloomfield, N. J.

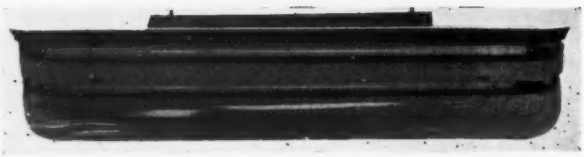


Fig. 1. Double-Lamp Fixture for the New 58-Inch 85-Watt White or Blue-White RF-Type Fluorescent Lamps

New RF-Type Fluorescent Lamps

Most recent addition to the fluorescent lamp family is the 58-inch 85-watt white RF type of lamp, designed especially for industrial lighting service. Identical in size, shape, and type to the earlier blue-white RF lamp which is already finding wide application in industry, the new white lamp provides a high level of white light approximately north sky daylight and can be used in most industrial applications, including many where color discrimination is important.

The RF-type lamps are designed to operate with special equipment providing direct current through a rectifying circuit, on either 105-to-125-volt or 210-to-250-volt 60-cycle alternating current. Single-lamp and double-lamp (Figure 1) fixtures are available.

Essential technical data follow:

Designation	Type RF
Service	Industrial
Lamp Watts (Approx.)	85
Color	Blue-White and White (Approx. 8000° K.)
Bulb	58"—T-10
Base	Special 2 and 3 Prong
Lumens (Approx.)	4250
Rated Average Laboratory Life	3000 Hours

Control Equipment

Standard control equipment for use with Mazda "F"-type fluorescent lamps is designed for use on 60-cycle alternating current circuits and for various ranges of operating voltages. This control equipment consists of a ballast which limits the value of the current in the lamp and a device which will connect the two electrodes in series with the ballast for a brief preheating period which is necessary in order to start the lamp. In the earlier control units this consisted of a thermal or magnetic relay mounted in the same case with the ballast. More recently a new type of starter known as the "glow relay" type and mounted in a more accessible location either in the end of the control unit or in a special socket attached to one socket of the lamp has been introduced. This has the advantage of easy replacement in the event of a failure; moreover the design of the glow relay is such that it consumes no power except during the brief starting period, and its action in restarting is more rapid than the thermal type.

Stroboscopic Effect—Two-Lamp Control Units

When fluorescent lamps were first introduced, it was feared that their application in certain industrial operations would be seriously limited by the stroboscopic effect which resulted from the fact that the light varied from a maximum to a minimum value 120 times in each second on a 60-cycle alternating current circuit. Under these conditions it is possible that the moving or rotating would be slower than this actual speed. This effect can be reduced to the point where it is entirely unobjectionable through the use of a two-lamp control unit, which employs a condenser in the ballast of one of the lamps.

The relation between the current through the two lamps, when a unit of this type is employed, is such that the light output from one lamp is at a maximum when that from the other is at a minimum and the resulting light from the two lamps is not subject to objectionable variations. This has the further advantage of producing a combined power factor of over 90% for the two lamps, as discussed in greater detail below.

The 85-watt RF-type lamp does not have stroboscopic effect due to its rectified circuits.

Power Factor Correction

A Mazda "F" lamp connected in a single control unit operates at a power factor of approximately 60%. This means that a larger current must be carried by the wires, and the resulting power losses and voltage drop may become a serious problem particularly in a large installation. One of the most satisfactory solutions to the problem is the use of a two-lamp control as mentioned above, and since most industrial lighting units employ two lamps, the problem of power factor correction is no longer a serious consideration in the application of fluorescent lamps. In installations where two-lamp controls are not practical the power factor may be corrected through the use of a condenser connected in parallel with the usual type of control unit. Such units are now available for use with a single lamp, or a single unit of larger size may be used to take care of a number of lamps.

The Application of Fluorescent Lamps in the Rubber Industry

In considering the application of fluorescent lamps in the rubber industry we are faced with a diversity of operations, many of which are unique to certain special production problems. It will therefore be convenient to divide all these operations according to their lighting requirements into three general headings: general lighting, localized general lighting, and local lighting.

Each of these three headings will be discussed in turn, and examples which are typical of the entire industry selected whenever possible to illustrate the particular type of lighting under consideration.

General Lighting

In a general lighting installation a substantially uniform level of illumination is provided throughout the entire work area, usually by means of reflectors spaced symmetrically throughout the area and mounted at a height of the same order of magnitude as the spacing between the units. (See Table 2.)

For the general lighting of industrial areas with fluorescent lamps either the RLM or RF-85 watt fluorescent lamp fixture can be used. The RLM 48-inch twin-lamp fixture (Figure 2), like other industrial lighting fixtures, is covered by RLM standards. These fixtures are made

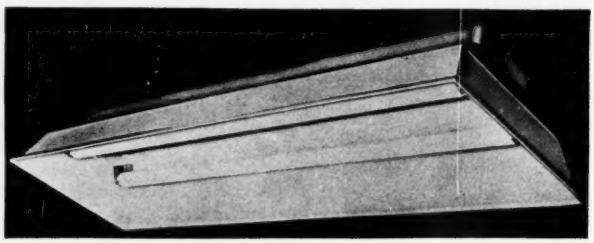


Fig. 2. The RLM Twin-Lamp Fixture for 48-Inch Mazda "F"-Type Fluorescent Lamps

by a number of manufacturers in accordance with specifications set up by RLM Standards Institute. Compliance with the specifications is checked by the Electrical Testing Laboratories, which is an independent testing organization. The reflecting surface is of porcelain enameled steel and the lamps are provided with a two-lamp auxiliary which corrects the power factor and prevents stroboscopic effect. The total wattage consumption of the complete unit consisting of two 48-inch lamps and the auxilary equipment is about 100 watts. When used with white fluorescent lamps, this is roughly equivalent in lighting results to a glassteel diffuser equipped with a 200 watt incandescent lamp. On the other hand the single RF 85-watt fluorescent fixture is equivalent to about the same wattage as the RLM fluorescent, but the double-lamp fixture about equals a 500-watt incandescent fixture in output.

If these sources are compared on a cost of light basis with allowance for all the factors ordinarily charged against the lighting, it will be found that the fluorescent lamps cannot be justified on a purely cost basis unless the current cost is in the range of 2.5¢ per K.W. hour or more. Since this is rarely the case in industrial plants, most of the actual installations to date have been made because of a desire to attain one or more of the other benefits of fluorescent lighting such as daylight quality, coolness, linear shape, or low brightness.

The high efficiency of the fluorescent lamps may become an important consideration in a relighting job where the existing wiring will not permit an increase in the wattage load. In an application of this kind it may be found more economical to install fluorescent lamps on the existing wiring than to go to the expense of rewiring for a higher wattage incandescent installation. It should be pointed out that this method is not practical unless the lamps are power factor corrected since otherwise it is not likely that any appreciable decrease in current will be attained.

Localized General Lighting

In a localized general lighting system the reflectors are mounted in definite relation to the machines or work areas in order to provide the higher levels of illumination of these points; yet their mounting positions are so chosen that they also provide sufficient light for the safe movement of men and materials in the remaining areas. An example of this type of lighting in the rubber industry is the lighting of a rubber mill of the type illustrated in Figure 3. An RLM 48-inch twin lamp fixture mounted directly over the mill, as shown, provides the higher levels of illumination at the most important work area—the rolls of the mill—and yet there is sufficient light for the operations which must be performed in the adjacent areas. The rectangular shape of the fixture corresponds with the shape of the area to be lighted, and it will be

TABLE 2. DESIGN DATA FOR DIRECT LIGHTING WITH MAZDA "F" TYPE FLUORESCENT LAMPS

Tables are calculated assuming the use of daylight 48″ fluorescent lamps. In the event that white fluorescent lamps are to be used or if other sizes than 48″ lamps are more suitable to the space requirements the following table of light outputs for the various fluorescent lamps available can be used to determine several combinations of lamps giving the same amount of light as the 48″ lamps. For instance, seven 18″ lamps are equivalent to two 48″ lamps.

Fluorescent Lamps	Lumen Output Daylight	Lumen Output White
18″ - 15 watt	450	555
24″ - 20 watt	660	820
36″ - 30 watt	1110	1380
48″ - 40 watt	1600	2000

Minimum Mounting Height (Feet)	Approximate Luminaire Spacing (Feet)	Floor Area Outlet (Sq. Ft.)	Average Foot-Candles—Number of Daylight Fluorescent Lamps							
			1-48″	2-48″	3-48″	4-48″	5-48″	6-48″	8-48″	12-48″
8	8 x 8	60-70	8.5-12	19-24	28-36	38-48	45-60	59-79	.....	.....
			6.5-8.5	14-19	21-28	28-38	34-45	46-59	.....	.....
			5-6.5	11-14	15-21	21-28	26-34	35-46	.....	.....
8½	9 x 9	70-90	7.5-10	15-20	22-31	29-41	37-52	49-68	.....	.....
			5.5-7.5	11-15	16-22	22-29	28-37	37-49	.....	.....
			4-5.5	8-11	12-16	16-22	21-28	27-37	.....	.....
9½	10 x 10	90-110	6-8	11-16	18-24	24-33	28-40	37-53	45-64	.....
			4.5-6.0	9-11	13-18	17-24	21-28	28-37	34-45	.....
			3.5-4.5	7-9	10-13	13-17	17-21	22-28	27-34	.....
10½	11 x 11	110-130	5-6.5	10-13	15-20	20-26	24-33	32-43	38-52	.....
			4-5	7.5-10	11-15	14-20	18-24	24-32	29-38	.....
			3-4	5.5-7.5	8-11	11-14	14-18	19-24	23-29	.....
11	12 x 12	130-150	4.5-5.5	9-11	13-16	17-22	21-28	27-37	33-45	48-63
			3.5-4.5	6.5-9	10-13	13-17	16-21	21-27	26-33	37-48
			2.5-3.5	5-6.5	7.5-10	10-13	12-16	16-21	19-26	28-37
11½	13 x 13	150-180	.....	7-10	11-15	14-20	17-24	23-32	28-38	39-55
			.....	5.5-7	8-11	11-14	14-17	18-23	22-28	30-39
			.....	4-5.5	6-8	8-11	10-14	14-18	17-22	23-30
12	14 x 14	180-210	.....	6.5-8	9-12	12-16	14-20	19-26	23-32	34-46
			.....	5-6.5	7-9	9-12	11-14	15-19	18-23	26-34
			.....	3.5-5	5.5-7	7-9	9-11	12-15	14-18	20-26
12½	15 x 15	210-240	.....	5.5-7	7.5-11	10-14	14-17	18-23	22-28	30-39
			.....	4-5.5	6-7.5	7.5-10	10-14	14-18	17-22	23-30
			.....	3-4	4.5-5.5	6-7.5	7.5-10	10-14	12-17	18-23
13½	16 x 16	240-270	.....	4.5-6	7-9	9-12	11-15	15-20	18-24	26-34
			.....	3.5-4.5	5.5-7	7-9	9-11	12-15	14-18	20-26
			.....	2.5-3.5	4-5.5	5.5-7	7-9	9-12	11-14	16-20
14	17 x 17	270-300	.....	.....	6.5-8	8.5-11	10-14	14-18	17-22	24-31
			.....	.....	5-6.5	6.5-8.5	7.5-10	10-14	12-17	18-24
			.....	.....	3.5-5	5-6.5	6-7.5	8-10	10-12	14-18
15	18 x 18	300-340	.....	.....	5.5-7.5	7-10	9-12	12-16	14-19	20-27
			.....	.....	4-5.5	5.5-7	7-9	9.5-12	12-14	16-20
			.....	.....	3-4	4.5-5.5	5.5-7	7.5-9.5	9-12	12-16
15½	19 x 19	340-380	.....	.....	5-6.5	6.5-8.5	8-10	11-14	13-17	19-24
			.....	.....	3.5-5	5-6.5	6.5-8	8.5-11	10-13	15-19
			.....	.....	3-3.5	4-5	5-6.5	6.5-8.5	8-10	11-15
16	20 x20	380-420	.....	.....	4.5-5.5	6-7.5	7-9.5	9.5-13	11-15	16-22
			.....	.....	3.5-4.5	4.5-6	5.5-7	7.5-9.5	9-11	12-16
			.....	.....	2.5-3.5	3-4.5	4.5-5.5	6-7.5	7-9	10-12
17	21 x 21	420-460	.....	.....	.....	5.5-7	7-9	9-12	11-14	15-19
			.....	.....	.....	4.5-5.5	5-7	7-9	8-11	11-15
			.....	.....	.....	3-4.5	4-5	5.5-7	6.5-8	9-11
18	22 x 22	460-500	.....	.....	.....	5-6.5	6.5-8	8.5-11	10-13	14-18
			.....	.....	.....	4-5	5-6.5	6.5-8.5	7.5-10	11-14
			.....	.....	.....	2.5-4	3.5-5	4.5-6.5	6-7.5	8-11
19	23 x 23	500-550	.....	.....	.....	4.5-6	5-7	7-9.5	8.5-11	12-17
			.....	.....	.....	3-4.5	4-5	5.5-7	6.5-8.5	10-12
			.....	.....	.....	2.5-3	3-4	4-5.5	5-6.5	7.5-10

Fig. 3. *(Left).* **An RLM 48-Inch Twin-Lamp Fixture Mounted over the Rubber Mill Provides Approximately 30 Foot Candles of Illumination on the Work**

Fig. 4. *(Below).* **A Fluorescent Industrial Fixture with Individual Alzak Reflectors for Each Lamp. Either a Spread or Concentrated Distribution of Light May Be Obtained**

found that there are many types of machines and work tables in any industrial area where this type of lighting may be used.

The RLM fixture produces a fairly wide spread or diffuse reflecting surface. Where greater concentration or more accurate control of the light is desired, a unit employing a specular reflecting surface should be used. In units of this type, Figure 4, each lamp is provided with an individual reflector, and very accurate control of the reflected light is possible. The new two-lamp white 85-watt fluorescent fixture could likewise be applied.

Fixtures of these types would be recommended if they were desired to light a calendering machine by means of fluorescent lamps. In an application of this kind the reflector could be set at an angle in order to direct the light on the vertical surface of the calender.

Numerous other applications of fluorescent lamps for localized general lighting in the rubber industry might be suggested, such as, work tables, hose braiding machines, vulcanizers of certain types, or any work area where a high level of lighting is desirable.

Local Lighting

One of the most important local lighting applications for fluorescent lamps in the rubber industry is for the numerous inspection operations, many of which are carried out by groups of operators seated at a table with a local light at each work position. In some instances light of daylight quality would be an advantage, but even when this is not the case, the coolness of the fluorescent lamp may be desirable, and their linear shape may be an advantage in making it possible to provide a high level of illumination over the entire work area.

The length of lamp which should be selected depends upon the size of the work area, and in many instances a continuous trough over a long table may be found advantageous.

There are also numerous other local lighting applications in all rubber plants, and a study of the requirements of any particular installation will soon reveal whether or not a fluorescent lamp would prove to be advantageous.

The comparatively large area lighted by one of these lamps frequently makes it possible to use a permanent mounting where a flexible mounting was necessary for an incandescent lamp. This has the advantage of eliminating the necessity of constant readjustment of the units, and the lighting results are usually more satisfactory since the high level local lighting is not confined to a small spot in objectionable contrast to the remaining areas. In this connection it might be emphasized that all high level local lighting must be supplemented by an adequate level of general lighting, which may be supplied either by the usual type of incandescent units or by fluorescent units.

Recent surveys in industry have revealed that lighting generally is totally inadequate for present-day needs. The fluorescent lamps offer an opportunity to obtain comfortable and efficient high levels of illumination which have been proved necessary for eyesight conservation. In the rubber industry, as in many others, it has become apparent that good lighting promotes safety, better workmanship, hence greater production and less spoilage. The question "How can I attain good lighting?" may be answered in numerous ways. To many lighting problems of the rubber industry, the fluorescent lamp may offer the best solution.

Perbunan and Its Use—II

SUPPLEMENTING Part I, which in the August issue discussed the characteristics and processing technique, we will now consider the effects of

Plasticizers or Softening Substances

Since Perbunan is less thermoplastic than natural rubber, it is desirable in many cases to increase its plasticity through the addition of various softeners. Proper choice of softeners enables one to improve the plasticity, tackiness, extrudability, and elasticity or other properties of the compounds. The addition of plasticizers is primarily for the purpose of facilitating Perbunan processing and of improving the properties of the finished compounds. Such softeners are not added to Perbunan as mere cheapeners although most available plasticizers do lower the compound cost. Depending upon the plasticizer in question and the purpose for which it is used, the addition of softeners will normally vary over a range from 5 to 10% of the Perbunan's weight and, in exceptional cases, be as high as from 100 to 150%. The softeners or plasticizers recommended for use with Perbunan can conveniently be classified into four groups described as follows:

Elasticators

This group covers those softeners which not only produce a marked softening effect on the Perbunan, but which also improve the rebound elasticity performance of the vulcanized compound. For example, a given Perbunan compound containing no softener may have a rebound elasticity of 40; the addition of 10 or 20% of one of these elasticators increases the rebound elasticity to 45 or 50%. These elasticators swell the Perbunan, but have very slight beneficial action so far as calendering and tubing are concerned. Typical products in this group are dibenzyl ether, triphenyl phosphate, phthalic acid esters, methyl ricinoleate, dibutyl sebacate.

Tackifying Softeners

The softeners in this class increase the tackiness of the unvulcanized compound containing them. This facilitates such processing steps as lamination and building up of belt or hose fabric plies. The tackifying softeners in most cases reduce the elasticity of the vulcanized compound and should, therefore, be used as sparingly as possible. Typical tackifiers are wood rosin, coumarone resin, rosin oil, alkyd resin, aldolalphanaphthylamine resin, coal tar, pine tar.

Extruding Softeners

As previously mentioned, Perbunan compounds have more nerve and less plasticity than natural rubber. They do not extrude and calender so well as natural rubber unless suitable agents are incorporated for this purpose. If the recommended extruding softeners are used with Perbunan, just as good results are obtainable as with natural rubber. However it is well to hold the amount of these extruding softeners to a minimum owing to their adverse effect on rebound elasticity and permanent set in the vulcanized product. Members of this group of extruding or dipping softeners are alkyd resins, non-oxidizing degras and wool-wax, solid and semi-liquid rubber substitutes.

[1] Chief chemist, Advance Solvents & Chemicals Corp., New York, N. Y.

The Function of Compounding Ingredients . . . . . .

C. A. Klebsattel[1]

Alkyd resins are available in gasoline-soluble and gasoline-insoluble grades. For maximum oil resistance the insoluble grades are of course preferable.

Degras and wool-wax are not too readily taken up by Perbunan in the absence of fillers. Some fluid substitutes should also be incorporated very slowly in the absence of fillers, or better still they should be incorporated along with the fillers.

Gasoline- and Oil-Resisting Softeners

For maximum resistance to these solvents, plasticizers insoluble in gasoline and oil should be used. Examples of such solvents are triphenylphosphate, adolalphanaphthylamine resin, alkyd resin, gasoline-insoluble.

Perbunan compounds very often are made up with a combination of plasticizers to achieve desired results. For instance, those softeners used to produce tackiness or good extruding properties detract from the rebound elasticity. Therefore it may be advisable to use with the tackifiers some of the elasticators, such as dibenzyl ether or the phthalates. Similarily, for such goods as extruded hose one might well use both an extruding softener and a gasoline-resistant plasticizer.

Pigments and Fillers

Perbunan exhibits its best properties when compounded with strongly reenforcing fillers and pigments. Pure gum Perbunan compounds are limited in their application to those fields where high tensile strength is not necessary. This being so, Perbunan usually is compounded with varying proportions of different fillers, the kind and amount being governed by the properties desired or the application to which the compound will be fitted. A brief outline of the effect of different fillers follows:

Channel Blacks

All classes of channel blacks produce high tensile strengths and abrasion resistance for a given loading. These hard blacks can be used with Perbunan to produce higher tensile strength compounds than the same blacks will yield with natural rubber. Likewise the channel blacks yield Perbunan compounds having a maximum of hardness and tear resistance for a given loading. On the other hand these hard channel blacks are inferior to softer blacks so far as their effect on permanent set, "creep," metal bonding characteristics, and rebound elasticity are concerned.

Semi-Reenforcing Blacks

Semi-reenforcing blacks produce with a given loading somewhat lower tensile strengths and hardnesses than the channel blacks. These blacks yield compounds of excellent appearance and flexibility. The ultimate elongation attainable is a bit higher than with channel blacks. These same semi-reenforcing blacks are outstandingly useful in

Perbunan to produce compounds having a maximum of rebound elasticity, a minimum of permanent set and "creep," better bonding to metal, and to give best resistance to fatigue and flex cracking.

White and Inert Fillers

These fillers regularly used in rubber compounding serve much the same purposes in general when incorporated into Perbunan. The principal point of difference is that some of these fillers will not produce the same tensile strengths, etc., for a given loading that they produce in natural rubber. However many of these fillers are very useful in Perbunan compounding for specific purposes, as outlined in the following paragraphs.

Zinc Oxide

Zince oxide is primarily useful in Perbunan compounding when used in small amounts to activate accelerators. For this purpose 2 to 5% on the Perbunan is usually sufficient. Somewhat larger proportions such as 15 parts on 100 of Perbunan are useful in combination with mercapto benzothiazole as an accelerator to secure a strong bond to metal through the use of chlorinated rubber as a bonding medium. Zinc oxide in moderation contributes to preserving the tackiness of Perbunan compounds which are to be built up layer on layer as in roll building or belt and hose frictioned compounds.

When any significant amount of zinc oxide is to be used in Perbunan, it is well to use a grade having a fine particle size. Zinc oxide in any case is not too easily wetted and dispersed by Perbunan; therefore it is recommended that it be added early in the compounding process to assure that it be thoroughly milled in and dispersed.

Clays

Clays are good bulk fillers for Perbunan. They are, of course, useful in reducing the volume cost because they are cheap, and certain grades will produce fairly good tensile strengths in Perbunan. Clays in general should not be used in any Perbunan compound where high rebound elasticity or particularly good permanent set characteristics will be required.

The purely inert fillers such as whiting, blanc fixe, and barytes are primarily useful in Perbunan only for the reduction of volume cost at the expense of tensile, elasticity, and permanent set. These inert fillers, however, do possess certain processing advantages since their presence does materially improve the extruding and calendering qualities of Perbunan compounds.

Magnesia

Calcined magnesia, or magnesium oxide, should not be used in large amounts in Perbunan since it induces hardening of the vulcanized stocks particularly if they are vulcanized in open steam. Even press-cured compounds containing large amounts of calcined magnesia undergo progressive hardening on aging, often going to the bone-hard stage. In this connection it may be noted that the light calcined magnesia behaves worst in this respect, with the heavier grades being less active in this manner. In spite of the above statements it has been found that a small amount of calcined magnesia such as three to five parts on 100 of Perbunan, is useful to improve the frictioning and spreading characteristics of the compounds. Magnesium carbonate as a rule does not cause the hardening that occurs with calcined magnesia, but there is no particular reason for using it as a general purpose filler.

The surface treated pigments, such as coated calcium carbonates, are useful in Perbunan compounds to produce low volume costs together with reasonably good tensile strengths which will approximate those obtained with clays. These coated pigments as a rule incorporate easily into Perbunan, but they, of course, detract from rebound elasticity and permanent set in much the same manner as do the clays and other inerts.

Antioxidants

Antioxidants are not needed in normal compounding of Perbunan since the raw material itself already contains a sufficient amount of phenylbetanaphthylamine to serve most purposes. This antioxidant already present will take care of all normal requirements, but it darkens on exposure to light, limiting the application of Perbunan to purposes where a pure white color or absolute color retention is not entirely necessary.

The one place where additional antioxidant can be used to advantage with Perbunan is in compounds designed specifically for heat resistance. For this particular purpose antioxidant MB or Aminox has proved outstandingly desirable when used in connection with a Thiuram cure. Through this combination Perbunan compounds can be produced which will outlast any compound possible with natural rubber or synthetic rubbery materials.

Waxes

Widely useful in Perbunan compounds, waxes are considered to be essential ingredients in mechanical goods and in any products made from Perbunan which will have to withstand exposure to sunlight or be subjected to flexing or tension strain in service. Suitable waxes in proper amount are absolutely necessary to render Perbunan resistant to sun-checking and to prevent flex cracking or surface checking when the product is subjected to a load in tension. In addition these waxes slightly assist extrusion of Perbunan compounds and they definitely improve the feel and surface perfection when they are used. These waxes in the recommended amounts will not interfere with bonding to metal through the use of chlorinated rubber, but they should be used sparingly in compounds which are to be fabricated by lamination.

Waxes should be used to the extent of at least 1% on the Perbunan for compounds subject in service to flexure or tension loading. For resistance to sunlight as much as 2% on the Perbunan is recommended. Higher amounts than 2% are normally not recommended except in compounds extremely loaded with fillers, or where a greasy surface bloom is unobjectionable.

Among the waxes we have found useful in Perbunan compounding are paraffin wax 122° or 135° F. melting point, Ozokerite, dark amorphous petroleum waxes, Sunproof, and Heliozone.

Stearic Acid and Metallic Stearates

Stearic acid is used in Perbunan for much the same reason that it is used in natural rubber, that is, to secure improved dispersion of hard channel blacks and to activate mercapto benzothiazole accelerators. Up to 3% on the Perbunan can be used to advantage in channel black loaded Perbunan stocks. Larger amounts make no further improvement and may lower adhesion of plies or bonding strength to metal. Smaller amounts may be used when the compound contains only moderate amounts of hard channel blacks. In any case stearic acid does not mill into Perbunan so easily as into natural rubber; hence it is recommended that it be added along with the channel black during milling to procure maximum effect from it.

Metallic stearates, such as zinc and aluminum stearates,

serve much the same purpose as stearic acid itself so far as dispersion assistance is concerned. In addition the metallic stearates, when used in larger amounts than is permissible with stearic acid, impart a leathery feel to Perbunan compounds which is sometimes advantageous.

Sulphur

Sulphur, selenium, or telurium serve to vulcanize Perbunan just as they do natural rubber. Sulphur, of course, is most widely used and it is applied in exactly the same manner as in natural rubber compounding. The sulphur may be used in free form or as available sulphur in combined organic form. The amount of sulphur necessary for normal, soft Perbunan stocks is less than is required for corresponding natural rubber compounds, the range is from 1% to 2% on the Perbunan.

Intermediate sulphur contents in the range of from 10 to 15% produce semi-hard, leathery compounds having flexibility superior to comparable rubber compounds. Such intermediate sulphur contents serve to produce hardness not otherwise possible, and at normal temperatures they age satisfactorily. However these semi-hard compounds will not age well at high temperatures and should never be used for such service.

High sulphur content, 30% or more, produces hard Perbunan compounds which are superior to hard rubber in practically every respect. They process easier; they mold more perfectly; blowing and blistering do not occur; the tensile strengths are equal to or better than rubber, and the softening point and solvent resistance are distinctly superior to hard rubber.

The following table illustrates the effect on various physical properties of variations in the sulphur content of a specimen Perbunan compound. From this table it is easy to see that in this particular compound, which is typical, a sulphur content over 2% produces two principal effects. First, the higher ranges of sulphur produce rapidly increasing hardness and modulus, while the elongation correspondingly decreases. Second, optimum tensile is attained with sulphur not over 2% on the Perbunan.

Perbunan	100
Dibutyl Phthalate	10
Coal Tar	5
Rosin	5
Stearic Acid	2
Zinc Oxide	5
Spheron	30
Altax	1.25
Dibutylamine	0.25
Sulphur	as in table following

Press Cure 40 Minutes @ 285° F.

Sulphur	Tensile Strength Lbs./In.²	% Elongation Maximum	Modulus @ 300%	Hardness Shore A
1	3180	750	420	50
2	3400	650	560	55
3	2820	500	1000	58
5	1970	300	1970	61
7.5	1820	200	...	65
10	1660	175	...	70

Accelerators

It is impossible to discuss thoroughly the effect of all accelerators on Perbunan. Therefore only the following random notes will be given.

In general, all existing rubber accelerators will hasten the cure of Perbunan compounds. But most satisfactory results are obtainable with certain classes of accelerators, and this discussion will be restricted to those commercial types found most practical in actual use.

Mercapto Benzothiazole

This material and most of its derivatives are useful with Perbunan provided its scorchy characteristic is recognized and reckoned with. Typical of this class is Captax, which should be activated by stearic acid.

Derivatives of mercapto benzothiazole such as Zenite, OXAF, and Santocure are suited to Perbunan compounding. Santocure alone or used with equal weights of D.P.G. is effective and scorch free. It works at temperatures of 285° F. (40 pounds steam) or higher. It is suited to mechanical goods and mechanical articles in general.

Benzothiazyl Disulphide

As typified by Altax, this type of accelerator is useful with Perbunan. Zinc oxide as an activator should always be used. This accelerator used alone is a very safe processing product. Its activity may be greatly increased by using with it some alkaline "kicker" such as dibutylamine, D.P.G., D.O.T.G., Guantal, Barak, or Thiuram. These products improve the physical properties as compared to Altax alone. The amount of these basic assistants used should always be a minor proportion because their use in excess renders the stocks a bit too scorchy to process safely. The following table is an illustration of this point:

Parts Accelerator per 100 Parts Perbunan	Processing
Altax 1.0%	Safe
Altax 1.0% plus 0.1% D.B.A.	Safe
Altax 1.0% plus 0.25% D.B.A.	Care Necessary
Altax 1.0% plus 0.35% D.B.A.	Very Scorchy
Altax 1.0% plus 0.2% D.P.G.	Safe
Altax 1.0% plus 0.4% D.P.G.	Very Scorchy
Altax 1.0% plus 0.15% Thiuram	Safe

D.P.G. or D.O.T.G. alone as accelerator for Perbunan is absolutely safe processing and scorch free in the absence of zinc oxide. So used, it operates best at 60 pounds steam pressure or over 300° F. The absence of zinc oxide sacrifices speed to attain entire safety in processing. Such stocks can be stored for extended periods of time and can be remilled repeatedly in entire safety.

Vandex and Accelerator 808

These materials are particularly suited to production of high sulphur, hard Perbunan compounds.

Litharge

Inorganic acceleration through the use of litharge will yield satisfactory cures of Perbunan, giving good fatigue resistant cures. Five per cent sulphur plus either 5 or 10% litharge may be used. Such a compound will require a relatively high temperature for vulcanization, and since part of the sulphur will combine with the litharge during cure, one will not obtain the hardness, etc., that would result through normal acceleration of the same sulphur content.

Ultra-Accelerators

Ultra-accelerators such as Vulkacit 774, Pip Pip, Zimates or Ulto act with Perbunan precisely as with natural rubber. They are a bit powerful for safe processing under normal circumstances and must be used with caution. However they are useful to produce very quick curing compounds and self-vulcanizing cements; to the latter they should be added separately in solution just prior to use. Such self-vulcanizing Perbunan cements containing these accelerators do not gel nearly so rapidly as corresponding natural rubber cements.

Organically combined available sulphur in the form of "Thiokol" VA#1, TUADS, or Tetrone A serves to cure Perbunan just as in the case of natural rubber. As with rubber, vulcanization through such a sulphur source produces compounds of superior heat resistance and aging characteristics. The amount used with Perbunan will be less than with natural rubber, just as in the use of free sulphur cures.

(To be continued)

Rubber at the 1940 Fair[1]

Diorama of Firestone Plantation Which Blends into the Exhibit Jungle in the Foreground

WHEN the New York World's Fair closes its gates on October 27, this gigantic show will end its two-year run. The millions of Americans who will have visited the rubber exhibits at the fair will understand more clearly how this 100-year old industry functions, will realize its tremendous importance in the world in which they live and its even greater significance in the world of tomorrow.

Firestone, not content with its successful exhibit of 1939, added a dramatic new feature to its 1940 show—a tropical jungle, reproduced with vines, trees, and plants from Liberia. Lending realism to this scene are live wild animals from the dense tropics of Liberia, the home of Firestone's rubber plantations. A diorama of a typical plantation blends into the tangled mass of plant life in the exhibit jungle. Features of the 1939 exhibit—tire factory, farmyard, exhibit hall of products, and the singing color fountain—are retained. Other new 1940 attractions include: the Airtex mattress; a revolving turntable of display figures, appareled in garments using Controlastic rubber thread (also shown in the World of Fashion); huge earth-moving implements, equipped with giant tires, nine feet in diameter; and prize-winning racing car with special Firestone tires. The 1940 season was highlighted on August 3 by the production of synthetic rubber tires at Firestone's factory at the fair, marking the firm's fortieth anniversary.

While the Goodrich exhibit remains essentially the same as last year, considerable revamping has taken place, and several new displays have been added. The "thrill arena" where Jimmie Lynch and his daredevil drivers test tires by putting automobiles through hair-raising stunts continues as the main attraction. A duo of comely young ladies, attired in Western outfits, has been added to this year's show. Within the building, popular 1939 features such as the Koroseal exhibit, the tire guillotine, auto suspension test of the Vulcalock process, manufacture of latex gloves by the Anode process, manufacture of rubber tire ash trays, and airplane de-icer are retained. 1940 innovations include: an animated reproduction of a Rube Goldberg cartoon satirizing antiquated methods of cooling truck tires; display of rubber surgical goods; panorama of tires for every transportation need; belting display; and the showing of Air Cell cushions and mattresses. In June an exhibit of the firm's new Ameripol tires, made from Goodrich's new butadiene synthetic rubber, was put on display.

As will be recalled, last year's neoprene exhibit at the Du Pont building featured a mill and press for compounding and curing the firm's synthetic rubber. This year's display comprises a laboratory where articles of both neoprene and rubber are subjected to accelerated service tests. Household gloves are immersed in furniture polish, giant sink scrapers in kitchen fats and greases. Hose which has been exposed to Florida sunlight is on display;

Testing Laboratory for Neoprene at the Du Pont Building

while a unique ozone generator, employing a "Jacob's Ladder" spark gap, is used to show the resistance of neoprene to oxidation. A product display illustrates the extensiveness of neoprene's present-day application.

Rubber's contribution to the fair is not limited to the rubber company exhibits. In many of the other buildings rubber is playing a prominent part, as indicated in the applications mentioned below. For example, Manhattan Rubber supplied the flexible rubber hand rails, each 283½ feet long, on the movable stairway that passes through the Trylon to the Perisphere. Other Manhattan contributions include the rubber-covering of the 300 moving

(*Continued on page* 47)

[1] This article stresses features new in 1940. For a complete description of rubber at the 1939 World's Fair see INDIA RUBBER WORLD, June 1, 1939, pp. 41-44.

Daredevil Drivers Testing Tires in the Goodrich "Thrill Arena"

German Patents Relating to Synthetic Rubber-like Materials—V

Law Voge[1]

ON MARCH 18, 1928, another patent[2] was applied for by Drs. Lecher and Koch and assigned to the I. G. Farbenindustrie A.G., Frankfurt a.M., as were all the patents discussed in this installment, on a "Process for the Preparation of Rubber-like Material," the object of which was to simplify the preparation of the emulsions and to stabilize them. The claim reads: "Solutions of emulsion-favoring substances in water are emulsified with solutions of emulsion-favoring substances in diolefines and such emulsions are polymerized with or without homogenizing." *Example:* An emulsion prepared from 75 parts by weight of a 10% aqueous solution of sodium oleate and a solution of five parts of magnesium oleate and 50 parts of 1,3-butadiene; the two solutions are combined and shaken in a pressure vessel, being subjected to gentle movement for ten days at 60° C. The yield is said to be high. Isoprene can be substituted for the butadiene of the above example, using equal amounts. Sodium stearate and aluminum stearate are also proposed as substitute ingredients. The yields with isoprene rise to 95% of the theoretical.

A patent[3] was applied for on April 1, 1928, by Dr. E. Tschunkur and Dr. W. Bock, on a "Process for the Preparation of Synthetic Rubbery Products by the Polymerization of Butadiene Hydrocarbons." This claim specifies: "In the sodium process, in inert atmosphere, the polymerization in the presence of small amounts of low-molecular saturated aliphatic ether." The example follows: Butadiene, 150 kilograms, di-iso-butyl ether, 0.75 kilogram, sodium wire, 0.25 kilogram. Polymerization accomplished in an autoclave in a nitrogen atmosphere at ordinary temperature (the pressure used is not stated). After three to four days the mixture is thoroughly polymerized. The yield is quantitative, and the product has high industrial value.

Drs. O. Schmidt, B. Schnell, and E. Meyer took out on May 9, 1928, the application for the patent[4] on a "Process for the Preparation of Synthetic Materials and Synthetic Substances of All Classes." The introduction of this patent states that intense heating of natural rubber produces transformed products, such as cyclocaoutchouc, which no longer have the properties of rubber and are resinous or oily bodies soluble in many solvents. Synthetic rubbers, for instance, isoprene polymers, behave similarly, and it has now been found that these latter products can be hardened. The claim of this patent specifies: "From polymerized butadiene hydrocarbons or their homologs in the presence or absence of fillers, the process of hardening by heating until the resultant products show no more extensibility." Sixteen examples are given, the first of which is: A sodium-polymerized butadiene product is heated with the exclusion of air to 250 to 300° C. First a plastic product is obtained that, on longer heating, becomes completely hard and solid, colorless and transparent, and can be cut to thin sheets for window glass. If plasticizers are used in the process, films can be formed and cut. These plasticizers can be polymerization products of isoprene not hardenable at high temperatures.

Dr. Schmidt on June 22, 1928, took out a patent[5] covering a "Process for the Preparation of Fibers, Bands, Skins, Films, Disks of Rubbery Polymerization Products of the Butadiene Hydrocarbons." The claim of this patent follows: "The treatment of the formed articles with sulphuring reagents in such amounts that on the one hand the products have lost their great extensibility and on the other hand are not completely hardened to substances like hard rubber." Ten examples are presented. In example 1 a cyclohexane solution containing 27% by weight of a rubbery polymerization product of butadiene (prepared by the action of sodium on butadiene) is carefully filtered. The solution then has "a viscosity of about 3,000." By means of an instrument known as a film-layer, the solution is laid in proper thickness on a highly polished base (glass or special metal) inert to sulphurous fumes and is dried at 60° C. in an atmosphere of nitrogen or carbon dioxide. Vulcanization follows with a mixture of sulphur monochloride, 400 parts by volume, with paraffin oil, 600 parts by volume; the sulphur monochloride is first purified by passing moist air through it for five hours. In the vulcanization chamber, from which air is excluded, the film is placed eight millimeters distant from the surface of the vulcanizing liquid. With a film thickness of 0.07 millimeter and a vulcanization temperature of 30° C., the film receives celluloid-like properties in 17 minutes. By heating the film to 60 to 80° C., and aerating, the excess sulphur monochloride is carried off, and by moistening the vulcanizate can readily be removed from the base. It is finally treated with 5% ammonia solution, rinsed, and dried.

A patent[6] for a "Process for Polymerizing Hydrocarbons of the Butadiene Series" was applied for July 13, 1928, by Drs. Schirmacher and Van Zuetphen. These inventors claim polymerizing butadiene hydrocarbons in the presence or absence of inert media, with caustic soda, cold or hot. (The reaction with metallic sodium had been found to be too quick—almost explosive and the resultant product, therefore, lacked uniformity). *Example:* Placed in a high-pressure vessel with shaking equipment, is a mixture of butadiene (liquid) 2,000 parts by weight, caustic soda 20 parts by weight. At a temperature of 30 to 50° C. it was left to stand "for a considerable time." The polymerizate is separated from the caustic soda by rubber solvents, or the caustic is decomposed by alcohol. The yield is said to be almost quantitative.

On July 18, 1928, application for patent[7] on a "Process for the Preparation of Rubbery Polymerization Products" was made by Drs. Luther and Heuck. The claim specifies for the emulsified diolefine process, with oxygen-producing reagents, treating the resultant polymerization product with reducing agents. *Example:* 200 parts by volume of isoprene mixed with 18 parts of volume of olein are shaken in 350 parts by volume of ammonia water (5%) and in which 0.5% of glue is present as a protective colloid. The hydrogen ion concentration of the emulsion is 8.9. A stable emulsion is thus obtained which,

[1] Research chemist and engineer, Washington, D. C.
[2] No. 526,498, granted June 8, 1931.
[3] No. 575,371, Apr. 27, 1933.
[4] No. 557,751, Aug. 27, 1932.
[5] No. 568,906, Jan. 27, 1933.
[6] No. 522,090, Mar. 30, 1931.
[7] No. 543,152, Feb. 1, 1932.

after the addition of five parts by volume of hydrogen peroxide solution (30%) and heating at 50° C. 48 hours, produces a synthetic latex. To the product is then added 30 parts by volume of sodium hydrosulphite solution (10%). The hydrogen peroxide present is decomposed, and by precipitation, by well-known means, a white polymerization product of good properties is obtained.

Application for patent[8] was made on August 26, 1928, by Drs. Ambros and Reindel on a "Process for the Preparation of Polymerization Products from Diolefines." The purpose of this invention was to accelerate the reaction and to improve the product. The claim covers the polymerization of emulsified material carried out in the presence of polymerized castor oil or its derivatives. *Example:* Ice water, 100 parts by volume, castor oil (polymerized) 10 parts by volume, and ammonia water (10%), 16 parts by volume, are actively shaken, and a stiff emulsion results which is combined with isoprene, 100 parts by volume, and hydrogen peroxide solution (10%), eight parts by volume, and all is shaken in an autoclave at 60° C. for three days. The yield is said to be 90% of the theoretical. The latex-like product is mixed with an excess of methyl alcohol, and the precipitated product filtered and dried in vacuum.

Drs. Tochtermann and Heuck on September 6, 1928, applied for a patent[9] covering a "Process for the Preparation of Rubbery Substances," the claim of which states: "Before or during the coagulation, adding an age-protective agent in emulsified form to the synthetic latex formed from non-decomposed distillable polymerization products of butadiene hydrocarbons." *Example:* To a synthetic latex (prepared by the process of patent No. 558,890[10]) is added an emulsification of five parts of aldol in 100 parts of water. After coagulation, a product of great strength is obtained.

A "Process for Preparation of Synthetic Rubber-like Material" formed the basis of patent application[11] on September 22, 1928, by Drs. Bock and Tschunkur. The claim states: "In the emulsion process for diolefine polymerization in the presence of such salts of organic bases with organic or inorganic acids which tend to emulsify the rubber-like hydrocarbons in aqueous solution." *Example:* A mixture of isoprene (or erythrene), 200 kilograms, diethylaminoethyloleylamidechlorhydrate (or acetate), three kilograms, and water, 100 kilograms, is shaken at 65° C. After some days an almost quantitative yield of a synthetic rubber latex is obtained.

On November 6, 1928, patent[12] was applied for on a "Process for Producing Coatings of Polymerization Products of Butadiene" by Dr. Schmidt. The claim on this special application of a synthetic rubber covers the treating of the laid-down material with oxygen, or air, or other oxygenous gas or oxygen-yielding reagent until the original extensibility has been lost. Five examples are presented, the first of which follows: Metal, wood, etc., are coated with a solution of lowly viscous, sticky product obtained by the polymerization of butadiene with sodium in the presence of a liquid hydrocarbon such as cyclohexane. By subsequent retention in hot air at 40 to 50° C. or at ordinary atmospheric temperature or in an oxygen atmosphere, after a time the desired hardness is obtained. A gas pressure can also be used during the last operation.

A "Process for the Preparation of Fibers, Bands, Coatings, Films, Disks, Etc., from Mixtures of Natural Rubber and Polymerization Products of Butadiene Hydrocarbons" also was applied for on November 6, by Dr. Schmidt.[13] The claim covers the expansion of patent No. 568,906[5] to the hardening of mixtures of natural rubber and polymerization products of the butadiene hydrocarbons. *Example:* A 5% clear hexamethylene solution of a rubbery polymerization product of butadiene with natural rubber in a ratio of 10:1 is poured on to a clean glass plate, and the solvent allowed to evaporate. In doing this, only the soluble natural rubber or that fraction soluble in a solvent (e.g., ether) is used, and the ether solution is freed of all impurities before the isolation of the rubber. The film so prepared is exposed to vapors of sulphur monochloride diluted with paraffin oil at 25° C. When the film has attained sufficient hardness, the vulcanization is interrupted, and for removal of the adhering sulphur monochloride the film is heated about one-half hour at 60° C. in a current of dry carbon dioxide. When necessary, the product can be washed in ammonia water. The film of 0.09 mm. thickness has a tensile strength of 4 kilograms,[14] an elongation of about 8%. This product is waterproof and fireproof and can be used to pack confectionery and other high-grade foodstuffs, for films and for fibers. Serviceable films contain 9% of sulphur and 10% of chlorine. Another example substitutes cyclohexane for the hexamethylene.

A patent,[15] applied for by Drs. Ebert and Fries, January 26, 1929, covered a "Process for the Preparation of Polymerization Products from Diolefines." Here the characteristic feature is the presence of cyclic diethers in the polymerization mixture; the claim reads: "Polymerization in the presence of alkali or earth-alkali metals carried out in the presence of small amounts of cyclic diethers." *Example:* Butadiene, 2460 parts, dioxane, 125 parts, are mixed in a rotating iron drum with 10 parts of metallic sodium (in the form of one millimeter diameter wire) and heated to about 40° C. The reaction begins quickly and continues very uniformly without appreciable increase in temperature or pressure. The polymerization is ended after 1½ days. The yield is 95%, and the product can be well vulcanized. This is one of the inventions to retard and make more uniform the reaction with metallic sodium.

Drs. Tschunkur and Bock took out a patent application[16] February 13, 1929, covering a "Process for the Preparation of Vehicle Tires," one of the earliest patents covering special applications of synthetic rubbers. Here the claim states: "In mixtures of butadiene polymerization products with highly disperse fillers—especially carbon black—the characteristic that mixed polymerizates be used as obtained by common emulsification or thermal polymerization of the dimethyl butadiene with other butadiene hydrocarbons." *Example:* 2,3-dimethylbutadiene, 10 kilograms, and 2,3-butadiene, 10 kilograms, are mixed together and emulsified with an aqueous solution of: sodium stearate, one kilogram, glue, 0.75-kilogram, sodium iso-butyl-naphthalene sulphonate, 0.25-kilogram, and combined with 20 liters of water in an autoclave. This mixture is then polymerized at 60° C. for eight to 10 days. (The pressure is not stated.) The product can be rolled to sheets and vulcanized with 50 to 60% of carbon black to form tires said to be excellent.

Drs. Klein and Beck applied for a patent[17] on February 24, 1929, on "Rubber Substitutes," which includes, merely incidentally, a mixture of a polymerizate of butadiene obtained by the emulsion process with coal tar and such fillers as zinc oxide, carbon black, sulphur, etc.

A "Process for the Preparation of Polymerization Products of Butadiene Hydrocarbons Soluble in Organic

[8] No. 526,305, May 13, 1931.
[9] No. 577,731, June 3, 1933.
[10] See India Rubber World, Aug. 1, 1940, p. 43.
[11] No. 555,585, July 23, 1932.
[12] No. 572,746, Mar. 22, 1933.
[13] No. 577,732, June 3, 1933.
[14] The cross-section of the test piece is not given, but the width is probably one centimeter.
[15] No. 520,104, Mar. 7, 1931.
[16] No. 551,967, June 8, 1932.
[17] No. 558,891, Sept. 12, 1932.

Solvents" forms the subject of patent application[18] on March 22, 1929, by Drs. O. Schmidt and B. von Bock. The claim covers the polymerization in the presence of hydrazine derivatives or their salts. *Example:* Butadiene, 100 parts, hydrazo-iso-butyrate, one part, water, 20 parts, hydrogen peroxide (3% solution), 20 parts, are shaken together and heated in a closed container 14 days. The product dissolves in ordinary rubber solvents and gives good vulcanization products. Other reacting agents cited are hydrazine, dicarbonylic diethyl ester, sodium phthalyl hydrazide, benzhydrazide, and hydroquinone.

On April 25, 1929, Drs. Luther and Heuck patented[19] a "Process for the Preparation of Rubber-like Polymerization Products." The main claim specifies: "Polymerizing butadiene hydrocarbons with alkali metals, etc., the polymerizing agent to be added in parts during the polymerization." *Example:* Thirty kilograms of butadiene are heated in a pressure vessel to 30° C. and then during a period of eight days 180 grams of sodium wire are added by means of appropriate compression equipment. The polymerization is complete after a further nine days.

An invention, the purpose of which is the quick hardening of the polymerization products, formed the object of a patent application[20] on May 14, 1929, by Drs. Eisele and Stoehrel, entitled, "Process for Hardening the Polymerization Products of Diolefines." Here the claim is: "The addition of metal carbonyls and optionally, combined with other hardening substances." *Example:* A product from polymerizing butadiene in the presence of toluene under pressure at 140° C., after addition of 1% of iron pentacarbonyl, is coated as a thin layer on to a base. The coating solidifies in considerably less time than without the specified carbonyl addition.

The same inventors, on the same date, took out another patent application[21] on a "Process for Hardening Polymerization Products from Diolefines." Here the claim covers the addition to the polymerization product of alkylated naphthalene sulphonate, optionally together with driers or oxygen-yielding reagents. *Example:* A polymerization product from butadiene and toluene under pressure and at 140° C., after addition of 1% of chromium salt of a "propylized" naphthalene sulphonate, is coated as a thin layer on a base. The coating solidifies in 1/10 the time needed if nothing is added to the polymerization product.

On May 30, 1929, a patent[22] was applied for by Drs. Ebert and Fries, on a "Process for the Polymerization of Butadiene Hydrocarbons." The purpose of this invention is again to regulate the reaction with alkali metals. The claim specifies: "Operating in the presence of small amounts of unsaturated ethers which are soluble in butadiene hydrocarbons." Nine examples are published. *Example* 1 follows: 100 parts of butadiene, one part of vinyl ethyl ether, and one-quarter-part of sodium are caused to react in a pressure-proof tinned iron vessel at 40° C. Polymerization begins immediately and is completed in 1½ days. The product gives excellent vulcanized articles. The following compounds are also suggested for use as substitutes for the vinyl ethyl ether: ethyl propenyl ether; vinyl iso-propyl ether; allyl ethyl ether; propargyl ethyl ether, α-phenyl vinyl ethyl ether; vinyl-*m*-cresyl ether; vinyl-α-naphthyl ether; cyclohexenyl-Δ-2,3 ethyl ether.

[18] No. 504,436, Aug. 7, 1930.
[19] No. 533,886, Sept. 21, 1931.
[20] No. 537,033, Oct. 29, 1931.
[21] No. 540,223, Dec. 8, 1931.
[22] No. 575,439, Apr. 28, 1933.
[23] No. 532,455, Aug. 28, 1931.
[24] No. 544,733, Feb. 22, 1932.
[25] No. 532,456, Aug. 28, 1931.
[26] Throughout these German patents the added carbon is termed in German, "Russ". This usually signified lamp black in the earlier literature, but doubtless here the more modern carbon blacks are intended.
[27] No. 570,980, Feb. 27, 1933.
[28] No. 564,910, Nov. 24, 1932.

The same inventors again applied for a patent[23] on June 11, 1929, on a more general "Process for the Polymerization of Diolefines." Here, likewise, the purpose is to secure more uniform reaction and a more homogeneous product. The claim states: "Polymerization is accomplished in the presence of such organic carbon compounds which have at least two valencies of the same carbon atom taken up by oxygen." Twelve examples are presented. *Example* 1: Butadiene, 1,000 parts, dibutyl acetal, 20 parts, sodium, three parts, are polymerized in a revolving autoclave. The reaction is quiet, and the product uniform and of moderate hardness. Other compounds proposed as substitutes in this reaction follow: ethylene acetal; crotonic acetal (+ or — butylene glycol); acrolein acetal; acetophenone; benzophenone; oleic acid; stearic acid; vinyl ethyl ether; diethyl phthalate; o-ethyl formate.

A "Process for the Preparation of Substances Similar to Hard Rubber" is the patent[24] of Dr. Zieser (July 6, 1929). In this invention a synthetic rubber—a polymerizate of butadiene—is combined with true rubber. The claim is a truly basic one covering merely a mixture of true rubber with butadiene polymerization rubber, to be worked into hard rubber.

On July 21, 1929, two patents were applied for by Drs. Tschunkur and Bock. In one[25] of these, on a "Process for the Preparation of High-grade Rubber-like Vulcanizates," the inventors refer to an earlier German patent application which has apparently not been granted, of June 10, 1927, but for which the equivalent French application is covered by French patent No. 655,217, covering the use of finely subdivided carbon as filler for synthetic rubber. In this present application they claim the use of such carbon for mixed polymerizates, as follows: "In vulcanizates of mixed polymerizates of butadiene hydrocarbons and olefine benzenes or their nuclear or side-chain homologs, the addition of finely sub-divided carbon, especially lamp black."[26] *Example:* Butadiene, 100 parts, styrol, 50 parts, sodium stearate, 15 parts, emulsified in 150 parts of water and polymerized (the temperature not stated). After a few days a good plastic polymer is obtained in high yield. This can be worked up with sulphur, 3%, zinc oxide, 15%, tar, 2%, stearic acid, 2%, gas carbon, 50%, and thiocarbanilid, 1%. This mixture is rolled in well-known manner and then vulcanized at 2½ to three atmospheres' pressure. The product has a tensile strength of 200 to 300 kilograms per square centimeter and an extensibility of 600 to 700%.

The second patent[27] covers a process for preparing rubber-like mixed polymerizates. Here the claim specifies mixtures of butadiene or isoprene or their unfinished polymerizates with olefinic-benzenes or their nuclear or side-chain homologs or the unfinished polymerizates of these substances, and polymerized by an emulsion process, the butadiene or isoprene being used in excess. *Example:* Butadiene, 100 parts by weight, styrol, 50 parts by weight, and sodium stearate, 15 parts by weight, emulsified in 150 parts of water and polymerized. After a few days a synthetic latex is obtained in good yield which can be vulcanized. If 130 parts of butadiene and 20 parts of styrol are used, they yield a polymer the vulcanizate of which is highly elastic. Three other examples are given.

Another application for patent[28] on the combination of natural with synthetic rubber was made on September 11, 1929, by Drs. Pungs and Beck. The claim specifies: "A process for the preparation of mixtures of natural rubber with butadiene hydrocarbon polymerization products, etc., mechanically, in that these are incorporated with oxidation reagents—montan wax (free from resin and asphalt)." *Example:* Sodium polymerizate of butadiene, 100 parts, montanic acid, seven parts, carbon black,

70 parts, sulphur, 0.75-part, piperidine piperidyldithiocarbamate, 1.5 part, and condensation product from aldol and alpha-naphthylamine, one part. This is mixed on the rolls and heated at 140° C. for 70 minutes. The tensile strength of the product is said to be 220 kilograms per square centimeter and the breaking extensibility 580%. Other illustrative examples are presented using butadiene polymerizates. In the above invention the montanic acid is purified from montan wax by process covered by German patents 409,420 and 451,187.

Drs. Ebert, Fries, and Garbsch made patent application[29] on October 11, 1929, covering a "Process for the Preparation of Polymerization Products of the Diolefines." The purpose of this invention is to produce uniform and less violent polymerizations with alkali metals. The claim covers "carrying out the said polymerization in the presence of small amounts of organic halides." *Example:* butadiene, 1,000 parts, ethylene chloride, two parts, and sodium, four parts. The polymerization is performed in a revolvable autoclave. The time required is three days. A good plastic adherent product is obtained, useful for films and coatings. Other halides proposed as substitutes are benzyl chloride, cyclohexane dibromide, quinaldine chloride, vinyl chloride, naphthalene chloride, and naphthalene bromide.

In the next patent application,[30] that of October 12, 1929, the name of the inventor is omitted, but as usual it covers a "Process for the Preparation of Polymerization Products of Butadiene Hydrocarbons." This is actually an equipment patent; the claim merely specifies during polymerization with alkali metals the use of metal containers having smooth highly polished interior surface and no rims. *Example:* 4,000 parts of butadiene, 40 parts of vinyl ether, and 16 parts of 1 millimeter sodium wire in the form of grains are polymerized in a tinned cylindrical autoclave with a highly polished inner surface.

Dr. Frederick Schwerdtel, on December 24, 1929, applied for patent[31] on a "Process for the Coagulation of Latex-Like Emulsions of Polymerized Butadiene-1.3 Hydrocarbons," to overcome the difficulty of the coagulator (the acid) remaining in the coagulate. Alkalies are proposed for use as they are more readily washed out than acids. The claim reads: "(1) Process for the coagulation of latex-like emulsions obtained by emulsion-polymerization of butadiene-1.3 hydrocarbons, characterized in that alkali salts, which possess no emulsifying properties, are added to the emulsion in amounts sufficient to cause coagulation. (2) Process as in Claim (1), characterized in that the alkali salts are used in the form of concentrated aqueous solutions."

Example: 100 parts by weight of a latex-like emulsion containing 24 parts by weight of polymerizate and prepared from the polymerization of butadiene-1.3 or of isoprene in emulsion with 10% sodium oleate solution is precipitated instantly and completely by the addition of five parts by weight of a saturated sodium chloride solution. An analagous emulsion with a content of 15 parts of polymerizate requires for precipitation 12 parts by weight of saturated sodium chloride solution. In other examples dimethylbutadiene is used. Another coagulant proposed is sodium isobutyl naphthalene sulphonate. In a further example, butadiene is polymerized with diethylaminoethoxyanilid and oleate, and precipitation accomlished with saturated solution of disodium phosphate.

This terminates the synthetic rubber patents of the period 1915 through 1929 derived from olefine hydrocarbons.

(To be continued)

[29] No. 524.668, May 11, 1931.
[30] No. 540,224, Dec. 11, 1931.
[31] No. 555,556, July 25, 1932.

1939 Accident Rates in the Rubber Industry[1]

The 1939 injury experience of the rubber industry is based on reports covering 53 plants whose employees worked 130,336,000 man-hours. Standings of the rubber industry were tenth in frequency and fifth in severity among 30 major industries.

The following facts briefly cover the important phases of the rubber industry's accident experience for 1939:

1. 1939 injury rates for the rubber industry averaged 8.02 for frequency[2] and 0.60 for severity.[3] The frequency rate was 32% below the average for all industries. The severity rate was 58% below the rate for all industries.

2. The industry's 1939 frequency rate was down 4% from 1938, but the 1939 severity rate rose 3%. These results compared unfavorably with decreases of 5% in frequency and 10% in severity for industry as a whole.

3. Over a period of years the rubber industry has, however, made more than average progress in reducing injury rates. Frequency was down 74% and severity 56% since 1926.

4. Large plants easily had the lowest 1939 frequency rates, averaging 7.37. Small units had the lowest severity rates, averaging 0.55. Both rates were reduced from 1938 to 1939 in small plants only.

5. Rubber footwear plants had the lowest injury rates in the industry: 2.30 for frequency and 0.30 for severity.

6. Tire manufacturing plants made the largest reduction in severity from 1938—18%. Rubber footwear plants made the largest improvement in frequency—20%.

7. Reports covering 56 fatalities and permanent partial disabilities occurring during the last six years show that the principal mechanical cause of such injuries were unsafe processes, poor housekeeping, and improper guarding. The principal personal causes were disobedience of instructions, abstraction, haste, and similar improper attitudes.

8. The Providence, R. I., plant of the United States Rubber Co. has the best all-time no-injury record in the industry—5,688,369 man-hours. The record began February 19, 1935, and terminated October 7, 1936.

[1] Abstracted from "1939 Accident Rates in the Rubber Industry," National Safety Council, Inc., 20 N. Wacker Dr., Chicago, Ill.
[2] Injury frequency rate is the number of reportable injuries per 1,000,000 man-hours of exposure.
[3] Injury severity rate is the number of days lost as the result of reportable injuries, per 1,000 man-hours of exposure. This rate includes arbitrary charges for permanent disabilities and deaths, in accordance with the standard scale.

The Uses of Rubber

Here's to the wonderful rubber,
That has so many uses;
It's hard to believe that we receive
So much from mere tree juices.

Its miracles are many,
In business, art, and science;
But long ago men learned to know
And use it with reliance.

Of course, no one is perfect;
Some problems are real facers;
But here again, mistakes of men
Are mended by erasers!

Carroll Van Court

Distributers' Tire Stocks in the United States, July 1, 1940[1]

THE results of the quarterly survey of retail stocks of automobile tires and inner tubes, as of July 1, 1940, are shown below in comparison with summary data for preceding quarterly surveys; the bases and methods described in earlier reports have been used in calculating the stocks held by the following three groups of distributers: 1. Individual dealers, including large and small retailers; 2. Distributers through oil-company chains; 3. Manufacturer-owned-and-operated stores, mail-order houses, and other important retail chains.

Distributers' Stocks Indicated by Surveys

Total distributers' stocks of motor vehicle casings are estimated at 8,048,000 on July 1, 1940, an increase of 499,000 during the second quarter and 1,146,000 above July 1, 1939. This is the highest total recorded in these surveys. Except for a slight decline in the third quarter of 1939, casing inventories have increased steadily since October, 1938.

The second quarter increase was reported by chain-store distributers; a slight increase in oil-company stocks was offset by a decline in stocks of individual dealers. A small second quarter increase is reasonably normal. The tendency toward larger stocks in 1939 was in line with rising total renewal sales.

	Thousands of Casings			
1940	Dealers	Oil Companies	Other	Total
July 1	3,281	1,796	2,971	8,048
April 1	3,312	1,755	2,482	7,549
January 1	2,996	2,000	2,014	7,010
1939				
October 1	3,122	1,487	2,250	6,859
July 1	2,900	1,646	2,356	6,902
April 1	3,018	1,725	2,074	6,817
January 1	2,735	1,838	1,920	6,493
1938				
October 1	2,588	1,840	1,990	6,418
July 1	2,767	2,079	2,163	7,009
April 1	3,007	1,869	2,051	6,927
January 1	3,015	2,115	1,920	7,050
1937				
October 1	3,000	1,774	2,289	7,063
July 1	3,363	1,996	2,299	7,658
April 1	3,835	1,853	2,304	7,992
1936				
Estimated	3,500	1,650	2,000	7,150

Slightly reduced stocks of inner tubes are indicated for each of the three groups of distributers during the second quarter of 1940.

1940	Dealers	Oil Companies	Other	Total
July 1	3,486	1,446	1,786	6,718
April 1	3,551	1,487	1,821	6,859
January 1	3,310	1,671	1,532	6,513
1939				
October 1	3,220	1,406	1,793	6,419
July 1	3,206	1,393	1,829	6,428
April 1	3,460	1,626	1,588	6,674
January 1	3,445	1,733	1,599	6,777
1938				
October 1	3,132	1,781	1,727	6,640
July 1	3,560	1,805	1,786	7,151
April 1	4,021	1,918	1,728	7,667
January 1	3,547	2,127	1,717	7,391

Dealers' Reported Stocks

Stocks reported by 1,372 individual dealers for 2,566 stores in the current survey are compared below with the inventory of the same firms April 1, 1940. Smaller stocks of both casings and inner tubes were reported by all except the large dealers, who show a further slight increase in their stocks of casings.

Number of Casings	Number of Dealers	Number of Stores	January 1, 1940 Casings	January 1, 1940 Tubes	April 1,1940 Casings	April 1,1940 Tubes
Under 200	888	1,034	79,028	107,733	74,355	97,416
200 - 500	308	508	98,574	98,883	94,825	95,951
Over 500	176	539	262,258	296,569	266,382	272,373
	1,372	2,081	439,860	503,185	435,562	465,740
Other July	387	485			117,492	121,884
Total July	1,759	2,566			553,054	587,624
Index numbers			94.6		93.8	99.6

Stocks of Special Dealer Groups

Stocks reported by 104 New York dealers with 160 stores in the current survey amount to 25,612 casings and 24,795 tubes, against 24,230 casings and 30,887 tubes April 1. Available reports from dealers handling tires of particular make were compiled in three instances, and two of those cases likewise showed slightly increased stocks of casings in the second quarter, but the decline in inner tube stocks was general. The preceding table includes data mentioned in this paragraph. When *aggregate* stocks held by dealers change so little as in the quarter under review, it is natural that differences in trend should occur for particular groups.

Oil-Company Distributers' Reported Stocks

Comparative returns were received from 38 firms in this group. Some reports covered stocks in central warehouses only; while others also covered stocks in about 16,000 retail outlets. While aggregate stocks of casings increased, lower stocks were reported by 17 firms in this group, and aggregate stocks of inner tubes were generally lower.

Oil-Company Reported Stocks

	April 1	July 1
Number of firms	38	38
Casings	991,330	1,014,859
Tubes	836,956	816,007
Index Numbers		
Casings	106.3	108.9
Tubes	89.8	87.6

Other Mass Distributers' Reported Stocks

Reports were received from six tire manufacturers operating 2,089 (April, 2,079) retail stores and covering stocks held in those outlets, and from eight other mass distributers operating 2,016 (April, 2,041) stores (and/or doing mail-order business) and covering their total stocks. The manufacturers' stores were holding 1,144,698 casings and 760,014 tubes, against 1,062,083 casings and 787,149 tubes April 1. The other firms in this group report sharply increased aggregate stocks of casings, but a decline for inner tubes.

(*Continued on page 47*)

[1] Supplement to *Rubber News Letter*, July 26, 1940. Prepared by Leather & Rubber Division, U. S. Department of Commerce, Washington, D. C.

Farm Equipment Tire Sizes Consolidated[1]

FORMED in January and representing the farm tractor and implement industry, and the tire industry, a committee has been working toward the simplication of farm tire sizes. The first phase of this Agricultural Tire Simplification Committee's work has been completed successfully by the reduction from 214 to 128 in the number of farm tractor tire sizes required by tractor manufacturers, and from 118 to 73 in the number of tire sizes required by implement manufacturers.

An official list, which shows the sizes approved by the joint committee representing the two industries, and the number of units sold last year in each size, is being distributed to all tractor, implement, and tire manufacturers with the urgent request that the engineers use this list of approved sizes in designing their tractors and implements and in selecting tire sizes for them. By means of this list the engineers will be able to pick those sizes which are already in production and to use, if possible, the items that are produced in greatest volume. For a listing of the approved sizes for original equipment see Table 1 covering farm tractors and Table 2 for farm implements. The committee plans to revise these lists semi-annually.

[1] Released May 28 by The Rubber Manufacturers Association, Inc., New York, N. Y.

TABLE 1. APPROVED FARM TRACTOR TIRE SIZES FOR ORIGINAL EQUIPMENT

Size	Ply	Description	1939 Unit Sales to Mfrs.	Size	Ply	Description	1939 Unit Sales to Mfrs.	Size	Ply	Description	1939 Unit Sales to Mfrs.
4-19	4	Rib.	4	11-38	4	Traction	2,160	7.50-18	4	Sgle. Rib	1,326
4-19	4	Single Rib	23,846	11-38	6	Traction	2,010	7.50-18	6	Rib	78
4-30	4	Traction	....	11-40	4	Traction	....	7.50-20	4	Sgle. Rib	36
5-30	4	Traction	....	12-24	4	Traction	....	7.50-20	4	Rib	621
5-40	4	Traction	....	12-26	4	Traction	4	7.50-22	2	Traction	4,104
5-44	4	Traction	....	12-26	6	Traction	....	7.50-22	4	Traction	2,548
6-12	4	Sgle. Rib	1,678	12-30	6	Traction	....	7.50-24 Exp.	2	Traction	6
6-40	4	Traction	....	12-38	6	Traction	365	7.50-24	4	Traction	1,419
6-44	4	Traction	....	13-26	6	Traction	....	7.50-36	6	Traction	211
7-32	4	Traction	10,849	13-30	6	Traction	....	7.50-40	4	Traction	53
7-36 Exp.	4	Traction	6	14-26	6	Traction	....	7.50-40	6	Traction	30
7-40	4	Traction	....	14-30	6	Traction	....	9.00-10	4	Rib	114
7-44	4	Traction	....	15-28	8	Traction	99	9.00-10	6	Rib	503
8-24	4	Traction	36,941	15-30	6	Traction	....	9.00-24	4	Traction	1,202
8-24 Exp.	6	Rc. & Cnfld.	....	4.00-15	2	Rib	6,638	9.00-24	6	Traction	858
8-32 Exp.	2	Traction	14	4.00-15	4	Rib	22,015	9.00-28	4	Traction	983
8-32	4	Traction	35,108	4.00-15	4	Sgle. Rib	78,188	9.00-36	4	Traction	25,187
8-36	4	Traction	5,468	4.75-15	4	Sgle. Rib	10,870	9.00-36	6	Traction	17,309
8-38	4	Traction	1,634	5.00-15	4	Rib	31,395	9.00-36	6	Rc. & Cnfld.	....
8-38	6	Traction	245	5.00-15	4	Sgle. Rib	21,310	9.00-40	4	Traction	8,875
9-24 Exp.	2	Traction	104	5.25-21	4	Rib	137	9.00-40	6	Traction	460
9-24	4	Traction	35,110	5.50-16	4	Rib	21,280	10.00-36	6	Traction	34,170
9-26	4	Traction	....	5.50-16	4	Sgle. Rib	78,964	10.00-36	6	Rc. & Cnfld.	....
9-28	4	Traction	260	5.50-16	6	Rib	495	10.00-40	6	Traction	8
9-28 Exp.	6	Traction	2	5.50-16	6	Sgle. Rib	1,988	10.00-40	6	Rc. & Cnfld.	....
9-32	4	Traction	....	6.00-12	4	Sgle. Rib	196	10.00-44	6	Rc. & Cnfld.	....
9-36	4	Traction	2,987	6.00-16	4	Rib	20,146	11.25-24	4	Traction	12,741
9-38	4	Traction	6,120	6.00-16	4	Sgle. Rib	29,427	11.25-24	6	Traction	7,835
9-38	6	Traction	3,385	6.00-16	6	Rib	495	11.25-28	6	Traction	1,616
9-40	4	Traction	....	6.00-16	6	Sgle. Rib	380	11.25-36	4	Traction	909
10-24	4	Traction	220	6.00-20	4	Rib	1,710	11.25-36	6	Traction	11,950
10-26	4	Traction	....	6.00-22	2	Traction	1,304	11.25-36	6	Rc. & Cnfld.	....
10-28	4	Traction	10,318	6.00-22	4	Traction	3,399	11.25-40	4	Traction	48
10-36	4	Traction	144	6.50-16	4	Rib	30	11.25-40	6	Traction	489
10-36	6	Traction	257	6.50-16	4	Sgle. Rib	....	12.75-24	6	Traction	2,053
10-38	4	Traction	5,357	6.50-16	6	Rib	105	12.75-28	6	Traction	3,960
10-38	6	Traction	4,972	7.00-24	4	Traction	6,789	12.75-28	6	Rc. & Cnfld.	....
11-24	4	Traction	88	7.50-10	4	Rib	456	12.75-32	6	Traction	1,733
11-26	4	Traction	....	7.50-10	6	Rib	796	13.50-24	6	Traction	624
11-26	6	Traction	....	7.50-16	4	Rib	370	13.50-28	6	Traction	2,583
11-28	4	Traction	18,781	7.50-16	6	Rib	124	13.50-28	6	Rc. & Cnfld.	....
11-28	6	Traction	15	7.50-18	4	Rib	3,819	13.50-32	6	Traction	486
11-36	4	Traction	141								
11-36	6	Traction	1,639								

Exp.—Experimental size.

TABLE 2. APPROVED FARM IMPLEMENT TIRE SIZES FOR ORIGINAL EQUIPMENT

Size	Ply	Description	1939 Unit Sales to Mfrs.	Size	Ply	Description	1939 Unit Sales to Mfrs.	Size	Ply	Description	1939 Unit Sales to Mfrs.
3.00-7	2	Implement	122	6.00-9	4	Implement	515	7.50-24	6	Implement	2,590
3.50-12	4	Rib	2,398	6.00-9	6	Implement	150	7.50-28	4	Implement	229
4.00-8	4	Implement	144	6.00-9	8	Implement	128	7.50-28	6	Implement	226
4.00-9	4	Implement	6,256	6.00-16	4	Implement	5,528	7.50-28	8	Implement	16
4.00-9	4	Single Rib	....	6.00-16	6	Implement	1,042	7.50-36	4	Implement	307
4.00-12	4	Implement	2,766	6.00-20	4	Implement	182	7.50-36	6	Implement	....
4.00-12	6	Implement	234	6.00-20	6	Implement	52	8.25-24	4	Implement	20
4.00-18	2	Implement	966	6.50-16	4	Implement	1,360	9.00-16	6	Implement	32
4.00-18	4	Implement	5,415	6.50-16	6	Implement	22,325	9.00-16	10	Implement	96
4.00-24	4	Trac. Impl.	....	6.50-24	4	Implement	141	9.00-24	6	Implement	1,538
4.00-30	4	Implement	134	6.50-24	6	Implement	501	9.00-24	8	Implement	238
4.00-36	4	Implement	1,109	6.50-36	4	Implement	1,897	9.00-36	4	Implement	137
4.00-36	6	Implement	208	6.50-36	6	Implement	1,833	9.00-36	6	Implement	408
5.00-15	4	Implement	3,891	7.00-16	4	Implement	640	9.00-36 Exp.	10	Implement	....
5.00-15	4	Trac. Impl.	4	7.00-16	6	Implement	18,851	9.00-40	8	Implement	427
5.00-16	4	Implement	18,529	7.50-16	4	Implement	2,404	9.00-40	10	Implement	....
5.00-16	4	Trac. Impl.	....	7.50-16	6	Implement	3,804	11.25-24	6	Implement	1,630
5.00-21	4	Trac. Impl.	....	7.50-16	8	Implement	1,224	11.25-24	8	Implement	1,160
5.00-21	4	Implement	5,536	7.50-18	4	Implement	1,311	11.25-28	6	Implement	178
5.00-36	4	Implement	99	7.50-18	4	Trac. Impl.	4,286	11.25-28	8	Implement	69
5.00-36	6	Implement	53	7.50-18	6	Implement	981	11.25-36	10	Hlsd. Cmbne.	196
5.00-40	4	Implement	72	7.50-18	8	Implement	224	12.75-32	6	Implement	222
5.00-40	6	Implement	52	7.50-22	4	Trac. Impl.	1,091	12.75-32	8	Implement	10
5.50-16	4	Implement	4,866	7.50-24	4	Implement	3,955				
5.50-28	4	Trac. Impl.	100	7.50-24	4	Trac. Impl.	2,727				

Exp.—Experimental size.

The Agricultural Tire Simplification Committee will continue to meet periodically for the twofold purpose for which it was established: (1) to eliminate other existing sizes as the need of them disappears; (2) to discourage the introduction of unnecessary new sizes which are not required by bonafide engineering considerations or other reasons. The Simplification Committee has repeatedly emphasized, however, that it will not take any steps that may retard experimentation, research, or progress in the adaptation of rubber tires to farm machinery, because it is recognized that this movement is still in its early stages and that further development can improve and perfect it.

The great rapidity of the growth in the use of rubber tires caused the number of sizes to become uneconomically large. For example, last year out of 214 tractor tire sizes offered to manufacturers 10 sizes, or 5% of the total number of sizes, represented 37% of the total units; the next 20 sizes, or 9% of the total, represented 34% of the units; and the rest of the sizes, 184, or 86% of the total, accounted for only 29% of the total units.

The use of an unnecessarily large number of sizes adds appreciably to the cost of the manufacture of tires, in mold depreciation, curing expense, machine changes, die costs; it increases the manufacturing problems of the farm tractor and implement makers and adds to the inventory burden of both implement manufacturers and dealers. Most important, perhaps, it causes inconvenience to the farmers by hampering interchangeability of wheels, by increasing obsolescence, and by making it more difficult to obtain readily the exact sizes needed for replacement.

The work of the Simplification Committee should make the transition from steel to rubber wheels on the farm more efficient and economical for farmer customers as well as farm equipment and tire manufacturers.

New Subway Seat Developed By Firestone

AFTER a three-year development period the Firestone Rubber & Latex Products Co., Fall River, Mass., has evolved a new type of subway seat which combines the cushioning qualities of Airtex (latex foam rubber) with the improved seat-covering properties of a new plastic woven fabric, known as Saran. The new seat was installed experimentally two months ago in one car of the Independent Division of the New York City Transit system. If this installation proves to be a success the new seat may be used in all new subway cars of the division and installed in all old cars whenever they are reconditioned. The Independent division has 1,800 subway cars now in service, and each car will require 58 cushion units, including both the seat itself and the seat back.

Saran is made from vinylidene chloride, which is a product of the Dow Chemical Co., Midland, Mich. The plastic is extended into strands by the Irvington Varnish & Insulator Co., Irvington, N. J. These extruded strands are then woven by the Heywood Wakefield Co., Gardner, Mass., into a box-weave fabric similar in appearance to the rattan covering now in use on the subway. The Heywood Wakefield Co. also builds the seat unit, utilizing a one-inch thick cushion of Airtex rubber over the coil spring base.

The Airtex, which replaces felt or hair as an upholstering material, will not mat down, it is claimed, and thus the seat will retain its shape over long periods of service. The porosity of the latex foam cushion is said to provide cool-riding and self-cleaning qualities. Taking the place of rattan in the seat covering, Saran is said to possess high tensile strength, flexibility, and long wearing qualities. Unlike rattan, it will not fray or sliver and thus cause damage to clothing and silk stockings worn by passengers. Presenting a smooth, glossy surface, Saran will not absorb dirt or moisture, and it is unaffected by strong cleaning agents. Pigments may be incorporated in the plastic before extrusion to produce fast permanent colors.

In this application Saran and Airtex are said to complement each other in their function, thereby creating a product superior to that which could be produced by the use of only one of these materials. Both the Airtex and Saran contribute to the new seat's properties of long wear and sanitation. Others experimenting with the new Airtex-Saran unit include: the New York Central Railroad Co.; the J. G. Brill Mfg. Co., bus and trolley car manufacturers; the Chicago subway system; and the Pennsylvania Railroad.

Rubber at the 1940 Fair

(*Continued from page* 40)

platforms in General Motors Futurama exhibit and the covering with rubber of the cow stalls at the electrified farm of the Electric Utility Industry. The rubber insulation for the 150-voiced "Polyrhetor" at the General Motors show was supplied by U. S. Rubber. Over in the amusement area is a water tank, 85 feet in diameter and lined by Goodyear with rubberized fabric, in which 20 circular power boats or Water-Bugs operate. These boats comprise a special smooth-tread Goodyear tire, fitted on a rim within which is a compartment for two persons.

At the Petroleum Institute building the following rubber products are used in the demonstration oil well: 50 feet of three-inch high-pressure rotary hose; eight-inch slush pump intake hose; 17 V-belts, 360 inches long, which operate the slush pump drive; 52 V-belts, 240 inches long, operating on the Diesel power unit; asbestos friction material on the hoist; and steam and fuel oil hose on the derrick.

Distributers' Tire Stocks

(*Continued from page* 45)

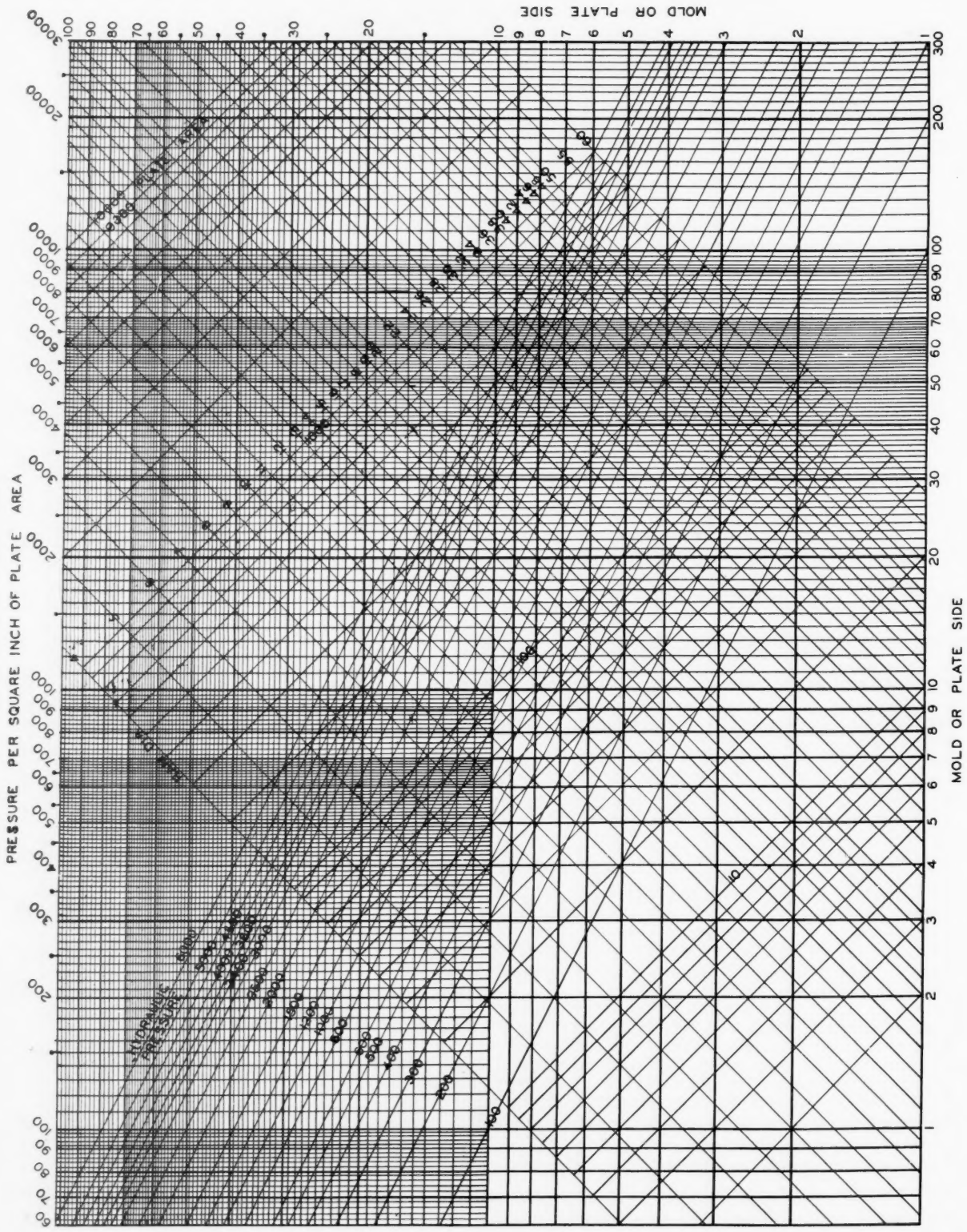
MASS DISTRIBUTERS' STOCKS

	April 1	July 1
Number of Firms	14	14
Number of Stores	4,120	4,105
Casings	2,482,417	2,971,329
Tubes	1,821,166	1,785,986

Acknowledgment

The support of the Rubber Manufacturers Association, Inc., the assistance of the National Association of Independent Tire Dealers, and the cooperation and promptness of dealers, oil-company distributers, manufacturers, and other mass distributers, in submitting data used in this report, are gratefully acknowledged. We especially thank all dealers who have submitted data and urge them to report regularly in future, as regularity is essential to trustworthy estimates of total dealers' stocks. The survey is open to participation by any tire dealer, and we will be glad to hear from dealers desiring to furnish data in order to receive our summary reports.

Pressure Analysis Chart for a Hydraulic



Press

P. B. Hunt

UNIT pressures are of considerable importance in rubber molding especially where it is desirable to reduce waste due to excess flash thickness. Production men, mold designers, and press designers will find this chart useful in facilitating the computations of hydraulic press operation so that a comparison of results from variable factors may be observed. In press design the chart is useful for observing results when changing ram size, plate size, or hydraulic pressure.

The chart consists of a series of logarithmic scales plotted as parallel lines in such angular relation to each other that, given the dimensions of a mold, the size of a ram, and the hydraulic pressure, the resultant unit pressure is made available by the tracing of parallel lines.

The scale at the bottom of the chart indicates one dimension (side) of mold or platen.

The scale on the right side indicates the opposite mold or platen side.

The juncture of parallel lines, from these two scales, in the body of the chart, indicates the area of any two dimensions selected.

The scale along the top of the chart indicates pressure in pounds per square inch of mold or plate surface resulting from conditions laid down by each problem.

In operation of the chart the numerical values of plate areas are not required, but parallel lines of constant area are required for transferring these areas over the ram scale. Therefore the plate area scale has been numbered only at the beginning of each log. scale: 10-100-1000-and 10,000.

The ram diameter and hydraulic pressure scales are used only as guide points for completing each individual problem.

The chart may be used in either direction, i.e., given a mold size, ram diameter, and hydraulic pressure: the unit pressure is found on the top scale. On the other hand, given a unit pressure, hydraulic pressure, and ram size: a series of plate sizes may be found, from which a suitable size may be selected.

A simple problem will illustrate the mechanics of utilizing the chart by any one familiar with the operation of hydraulic presses.

PROBLEM: Given a mold 20″ x 30″, a ram of 18″ dia., a hydraulic pressure of 2,000 lbs. What unit pressure will be applied to the mold?

SOLUTION: From the juncture of the 30 line on the bottom scale with the 20 line on the right-hand scale follow the angular line until it connects with the 18″ ram line. Then moving to the left, parallel with the horizontal lines, contact the 2,000-lb. line. From this point move vertical to the top scale and read 850 lbs. per square inch on the mold.

More Street Cars Use More Rubber

THE modern streamlined trolley car, built to specifications of the President's Conference Committee of the street railway industry, which were set as the result of research participated in by many leading industrial laboratories at a cost of $1,000,000, incorporates 1,009 rubber parts, using about 400 pounds of rubber, to result in greater efficiency and operating smoothness, speed, and silence. Known as "P.C.C. cars," they are described as "the most completely rubberized mass transportation vehicle yet built," by The B. F. Goodrich Co., Akron, O., which has aided in the work by developing rubber transit car spring suspensions and "sandwiches" of rubber to dampen sound in a unique wheel assembly. Goodrich, according to J. D. Beebe, manager of the new products department, also supplies other rubber parts scientifically designed to avoid "metal-to-metal" noises and vibrations and give cushioned-in-rubber riding qualities.

Within the past four years 13 cities, including Brooklyn, with the first installation, Chicago, Baltimore, San Diego, Cincinnati, San Francisco, Los Angeles, Toronto, Washington, Philadelphia, Pittsburgh, and St. Louis, have put 1,023 of these ultra-modern lightweight trolley cars in service; while delivery of 1,000 new models to Chicago will give it what is said to be the most up-to-date rapid transit system in the world. Pittsburgh, with 301 units in service has the largest fleet of modern vehicles yet purchased by a single street railway company.

Other improvements, besides rubber, in construction are widespread use of duralumin and aluminum, non-glare lighting, a scientific ventilation and heating, innovations in braking, control, and assembly, new glare eliminator behind the streamlined windshield, new type of motor, lower steps, and smartly furnished interiors.

The cars have also been used within the last year in subway service by the B.M.T. lines, and similar cars are being considered for the new Chicago subway.

Frank Shepard, consulting engineer of the Brooklyn lines, reported that the new car in some cities increased revenue 33% and schedule speeds, up to 15%, and reduced accidents by 24%.

Government to Buy Added 180,000 Tons of Rubber in 1941

THE following statement was issued by Jesse Jones, Federal Loan Administrator, on August 17:

"The Rubber Reserve Co. has agreed with the International Rubber Regulation Committee, represented by Sir John Hay, that it will buy an additional reserve stock of rubber up to 180,000 tons during 1941, at a price range basis of 17 to 18½¢ a pound, F.O.B. transoceanic ships at point of shipment.

"This 180,000 tons, with the 85,000 tons acquired through the barter agreement with Great Britain in exchange for cotton, and the 150,000 tons which the Rubber Reserve Co. has heretofore agreed with the International Rubber Regulation Committee to buy during the remainder of this year, will, when the rubber is received, provide a reserve stock in excess of 400,000 tons.

"The RFC has authorized additional loans to the Rubber Reserve Co. of $75,000,000 to purchase and carry this 180,000 tons."

It will be recalled that the first agreement[1] calling for the purchase of 150,000 tons of rubber this year had a price basis of 18¢ to 20¢ per pound, c.i.f. New York, whereas the present agreement stipulates a basis of 17¢ to 18½¢ a pound, F.O.B. At present freight and insurance rates the latter range would be 1.2¢ to 1.8¢ higher, basis c.i.f. New York, or 18.2¢ to 20.3¢ per pound, which is slightly higher than the price range of the first agreement.

To obtain a complete picture of the future U. S. rubber supplies, stocks held by manufacturers, dealers, importers, etc., should also be included. These stocks amounted to nearly 160,000 tons (R.M.A. estimate minus government stocks) at the end of July, 1940. Adding this to the 415,000 tons of agreement rubber, the total would be about 475,000 tons, or close to the present yearly U. S. rubber requirements of 600,000 tons.

[1] INDIA RUBBER WORLD, Aug. 1, 1940, pp. 42, 44.

EDITORIALS

Scrap Rubber and Reclaim Are National Assets

AT THIS time great stress is rightly being placed on the importance of natural rubber and the need of a substitute material in the event that our normal supply should be interrupted. Quite naturally, attention has been directed toward the possibility of producing in this country huge quantities of synthetic materials suitable for complete or partial replacement of natural rubber either for all uses or for specialized applications. Likewise, $500,000 has been appropriated by Congress, and research has been accelerated with a view to the establishment of new rubber plantations in the Western Hemisphere so as to reduce our dependency upon Far Eastern sources and long-distance transportation. These avenues of relief from dependency are very fine, but the accomplishment of large-scale results must necessarily require a considerable duration of time.

A very effective agent for alleviating the situation in a minimum of time is found in our reoccuring supply of spent rubber products which have served their original purpose, but which can be processed so that the rubber can be rendered reusable. Although complete substitution of reclaimed for crude rubber would not be desirable, and by inverse progression the serviceability of the product would be lessened gradually under continued high substitution, a definitely higher percentage of reclaim on the crude can be used for quite an extended period.

An excess of rubber scrap over collections is available right in this country from which a larger tonnage of reclaimed rubber can quite readily be obtained. The trend in scrap collection by years from 1921 to 1939 was indicated in statistics given in the June 30 *Rubber News Letter* prepared by the Leather and Rubber Division of the Bureau of Foreign and Domestic commerce. In 1929 and 1930 the scrap collections were approximately 50% of the total crude and reclaimed rubber that had been processed three years previously. Before and after that period the percent. of collections, to the amount of crude and reclaim processed three years earlier, was considerably lower, and during the period 1937 to 1939 inclusive the collections were 32.7% of the input in 1935 through 1937. In this period only 662,100 tons of scrap were collected; whereas, on the same proportion as in 1929 and 1930, more than 1,000,000 tons were available. Not all of the scrap collected becomes reclaimed rubber as some after grinding goes directly into compounds for specific purposes, and other quantities are exported.

It is quite evident that with increased attention to collection and restriction of exports a much larger quantity of basic material is available for the production of reclaim and that by concentrated effort in this direction our stock of crude rubber at any particular time can be used to much greater advantage than under present ratios of reclaim to crude.

In 1939 there were 35 firms which were producing reclaimed rubber, of which 22 were rubber companies producing reclaim only for their own consumption and having no sales organizations. The 1939 reclaiming industry, as a whole, operated at 71% of its 1938 capacity. However 35% of the industry operated below the 71% average. Even though it is improbable that all companies could reach capacity production at the same time, there is available an appreciable excess of capacity which could be put to work in a very short time, and new additional capacity could be created by adding to the equipment.

With an excess of raw material and established industries for collection and reclaiming, this domestic product, which can more extensively replace crude rubber, assumes an important position in any plans to cope with an emergency situation.

Rubber Stocks Increasing

ACCORDING to statistics for July, as released by The Rubber Manufacturers Association, the flow of crude rubber to the United States is very appreciably on the increase. Gross imports, as reported by the Department of Commerce, were 69,474 long tons, an increase of 28.9% over June and 85.9% more than in July, 1939. Total domestic stocks on July 31 are estimated by the R. M. A. at 190,222 long tons, an increase of 13.1% more than at the end of June and 15% higher than on July 31, 1939. Crude rubber afloat to the United States on July 31 is estimated at 139,629 long tons or 17.2% above that at the end of June and 163.3% more than the rubber afloat on July 31, 1939.

The combined increase in domestic stocks and rubber afloat between June 30 and July 31 amounts to 42,478 long tons, an amount which approximates the estimated July consumption of 47,011 long tons. At the end of July the total of domestic stocks plus rubber afloat was 329,851 long tons, or between six and seven months' supply in relation to consumption this year. These statistics indicate that the mechanism for increasing shipments to this country has been so geared that there is a good probability that the recent program discussed in this column in the August issue will be fulfilled.

In accordance with the second agreement between the Rubber Reserve Co. and the International Rubber Regulation Committee (see page 49, this issue), present plans call for a total of 415,000 long tons of government held rubber. Inasmuch as the I.R.R.C. is a party to these agreements, it may be presumed that shipment quotas are supposed to be such as to provide the necessary rubber.

S. C. Stillwagon

EDITOR

What the Rubber Chemists Are Doing

21 Papers Scheduled for Rubber Division Meeting

A SYMPOSIUM of six papers on automotive rubber, 14 general papers, and a special paper on butyl rubber are scheduled for presentation before the Division of Rubber Chemistry, A. C. S., at its meeting in Detroit, Mich., September 12 and 13. Division headquarters will be the Book-Cadillac Hotel; while technical sessions will be held in the Masonic Temple.

On Thursday morning and afternoon, after introductory remarks by E. B. Curtis, division chairman, the symposium on "Rubber, Synthetics, and Plastics in the Automotive Industry as Viewed by the Engineer and Chemist," which was arranged by the Detroit Rubber Group, will be held. This will be followed at 3.45 p.m. by the presentation of a paper, entitled, "Butyl Rubber, a New Hydrocarbon Product, by R. M. Thomas, I. E. Lightbown, W. J. Sparks, P. K. Frolich, and E. V. Murphree (Standard Oil Development Co., Linden, N. J.). This paper, which is intended to reveal the chemical and physical properties of Standard's recently announced synthetic rubber, will be first presented before the general meeting of the American Chemical Society on Monday, September 9. The Thursday afternoon session will close with the report of the Crude Rubber Committee by George Sackett.

On Thursday night the divisional dinner will take place in the grand ballroom of the Book-Cadillac. W. J. Cameron, executive vice president of the Ford Motor Co., will be the speaker for the occasion. In addition there will be music and other entertainment between courses. At the all-day Friday session, the excellent group of general papers will be presented. The affair will close with the regular business meeting of the division.

The abstracts of three symposium papers and the titles of the other three papers for which no abstracts were available are presented below, followed by abstracts of the 14 general papers. No abstract of the paper on butyl rubber was available.

Rubber in the Automotive Industry from the Viewpoint of the Automotive Engineer. Compounded rubber materials are essential to the modern automobile. The various applications and desired qualities are discussed, illustrating these applications with the aid of a chassis. Some of the discrepancies of past and present rubber parts and improvements made or needed to correct them are discussed. Close cooperation between rubber technologists and design engineers to provide a basis for selecting and developing rubber compounds of suitable properties is emphasized. Geo. W. Lampman and C. F. Smart, General Motors Corp., Pontiac, Mich.

Rubber-Like Synthetics in the Automobile Industry. Synthetic rubber already plays a vital part in the manufacture of automobiles and will be more important in the future regardless of trends in Far Eastern affairs which might make synthetic rubbers all-important to this country. Automotive laboratories continue to highlight research in elastomers. While synthetics of today are greatly improved over those of a few years back, much is still to be desired in their qualities. Uses of synthetic rubber have increased steadily in face of high costs, but this use could be greatly accelerated by further decrease in costs. J. C. Zeder, Chrysler Corp., Detroit, Mich.

The Use of Rubber in the Automotive Industry from the Viewpoint of the Rubber Technologist. The automotive applications of rubber are extremely diversified and illustrative of the many unique and useful properties of rubber. Progress in rubber technology has led to constant improvement in the performance of rubber parts, of which tires a e the most important. Improvements will continue to be made to produce rubber parts still more suited to the needs of the automotive industry. Consideration of trends in design indicates a further extension of the use of rubber, and some of the newer applications will be described and discussed. Sidney Cadwell, United States Rubber Co., Detroit.

The Standardization and Coordination of Automotive Rubber Parts Specification. L. A. Danse, Cadillac Motor Car Co., Detroit.

The Use of Synthetic Rubber in the Automotive Industry from the Viewpoint of the Rubber Technologist. J. N. Street, Firestone Tire & Rubber Co., Akron, Ohio.

The Use of Plastics in the Automotive Industry. W. M. Phillips, General Motors Research.

The Crystallization of Vulcanized Rubber. The crystallization of unvulcanized rubber in the unstretched state has been observed in previous work to occur at temperatures between 10° and -40° C.; the crystals melting in a range from about 6 to 16° C. Similar observations have now been extended to two sets of rubber compounds: the one set vulcanized with sulphur alone in amounts up to 0.5%, and the other set vulcanized with tetramethyl thiuram disulphide (Tuads) in amounts up to 4% and containing 2% of zinc oxide. Change of volume, as measured in a mercury-filled dilatometer, was taken as the criterion of crystallization. At about 1° C. all the compounds studied were found to crystallize, the time required for completion of the process increasing with the amount of sulphur or tetramethyl thiuram disulphide from about 10 to 200 days. With increase in the amount of vulcanizing agent, the change of volume on crystallization was found to decrease from the order of 2.5% to the order of 1.5%. The melting of the crystals in all cases occurred over about the same range as the unvulcanized rubber. Although the maximum amount of sulphur in the rubber-sulphur compounds was insufficient to give satisfactory, mechanical properties, this was not the case with the tetramethyl thiuram disulphide, for which the amounts employed span the range of commercial usage. Norman Bekkedahl and Lawrence A. Wood, National Bureau of Standards, Washington, D. C.

Transparency of Rubber Compounds Containing Magnesium Carbonate—II. Previous X-ray data have indicated that magnesium carbonates which maintain transparency, when used as fillers in vulcanized rubber samples, are the basic compound, $5MgO.4CO_2.xH_2O$. A systematic program of quantitative analysis of several samples of domestic and foreign origin has been carried out to verify this theory. The results show that both domestic and foreign samples maintaining high transparency are exceedingly pure $5MgO.4CO_2.xH_2O$. Samples which, when compounded into rubber, result in inferior light transmitting sheets consist of mixtures of this basic compound and the normal magnesium carbonate, $MgCO_3$. Even small percentages of the normal carbonate will cause a considerable reduction in light transmission due to its exceedingly unfavorable refractive index. If, on the other hand, a $5MgO.4CO_2.xH_2O$ carbonate is employed containing a small percentage of hydrated magnesium hydroxide, $MgO.xH_2O$, the transparency is less affected because its refractive index is not so widely different from that of rubber.

Particle size of the carbonate becomes an important factor in maintaining transparency when basic magnesium carbonates containing some of the normal carbonate are employed. In the particle size range encountered in commercial samples smaller particle size of the normal carbonate will provide greater surface from which undesirable reflection and refraction may take place, thereby lowering the light transmission of the rubber sheet. W.

F. Bixby and H. I. Cramer, University of Akron, Akron.

A Study of the Nitroparaffins and Their Derivatives as Heat Sensitizers for Compounded Rubber Latices. When rubber latices containing a small amount of zinc ions are treated with a nitroparaffin, a halonitroparaffin, or hydroxynitroparaffin and heated, a rapid gelling results. Many nitroparaffins and derivatives, recently made commercially available, have been tested. Apparently all nitroparaffins and their derivatives in which the nitro group is unchanged are heat sensitizers.

Nitroethane and 2-nitro-2-methyl-1-propanol are the preferred examples. Latices sensitized with either of these agents are potentially very useful in latex technology, such as dipped goods, molded goods, and foams. The use of these heat sensitizing agents is not limited to rubber latices, but may be used in neoprene latex, crude rubber and reclaimed rubber dispersions. Nitroethane is fugitive, being readily volatile; while 2-nitro-2-methyl-1-propanol is very water-soluble and thus readily washed out of the rubber composition. Moreover neither is harmful to rubber. Latices sensitized with 2-nitro-2-methyl-1-propanol have the unique and valuable property of enduring long periods of storage at room temperature without gelling, but retaining the ability to gel when heated. Arthur William Campbell, Commercial Solvents Corp., Terre Haute, Ind.

The Effect of Various Sulphur-Accelerator Ratios in Vulcanized Rubber as Shown by a Series of Laboratory Tests. During recent years much emphasis has been placed on the use of extremely low sulphur (0.5 or under) for the production of rubber compounds designed for extraordinarily good aging properties. Stocks so designed have been found very useful for wire insulation and some other products in which extremely good aging is of paramount importance. It is felt, however, that there has been a tendency to extend the use of low sulphur to places where it is neither required nor suitable. A number of cases are known in which low sulphur has been used with definitely detrimental results on properties other than aging. The present work was undertaken for the purpose of determining which properties of rubber compounds were improved by low sulphur and which were not, in hope of shedding new light on the subject.

The results obtained indicate that while low sulphur stocks age better than others, as judged by the usual stress-strain data, and while (when properly accelerated) they will produce low heat generation, low permanent set, and low compression set, they do not produce good flexing or good Fade-Ometer resistance. They are not outstanding for resistance to tear, to oil, or in tensile tests at elevated temperatures. The data illustrate the fact that while low sulphur compounds may be extremely useful in some applications, they should be used with extreme caution or avoided altogether in other types of service. While a considerable amount of work has been done and much data collected, it is not felt that the subject has been exhausted. F. S. Conover, Naugatuck Chemical Division, U. S. Rubber, Naugatuck, Conn.

Effect of Petroleum Products on Neoprene Vulcanizates. Ia. Effect of Lubricating Oils. A volume increase test after immersion into lubricating oils is frequently made part of the requirements of control specifications for fabricated neoprene parts. Because of the probable intended use for the neoprene part, such a test is entirely logical provided the conditions (time and temperature of immersion) of the tests are intelligently chosen. Lubricating oils are often used as the immersion media rather than other petroleum derivatives, such as kerosenes, fuel oils or gasolines. The former media are generally preferred because of the decreased fire hazard and storage risk and because they undergo less chemical change upon long-time storage or during the actual immersion test.

If an arbitrarily chosen oil is selected as a standard, it is necessary to include in the specification for the oil some test which will delimit the oil with respect to its swelling effect on neoprene vulcanizates. This is especially necessary when various laboratories agree to use a given oil as a standard for purposes of reference or cross testing work or where the original oil is to be duplicated. The previous paper of this series[1] showed that in the case of commercial lubricating oils the viscosity-gravity constant may be successfully used as a criterion of the swelling effect of an oil on neoprene vulcanizates, the volume increase at swelling equilibrium being a logarithmic function of the viscosity-gravity constant.

The viscosity-gravity constant is calculated from constants, the determination of which involves the use of rather specialized apparatus. However it is shown that the aniline number, a determination which may be easily made and does not require special equipment, is as equally reliable as the viscosity-gravity constant when used as a criterion of swelling effect of commercial lubricating oils. With special oils, such as technical white, spindle, and process oils, the aniline number appears to give more reliable results. In the case of compounded hydraulic brake oils a relation exists between the aniline number of the oil and volume increase of the neoprene vulcanizate, but the relation is of a different order than that in the case of lubricating oils. In both cases the volume increase at swelling equilibrium is a logarithmic function of the aniline number. Because of the presence of compounding ingredients in hydraulic brake oils, it is necessary to take extra precautions in determining the aniline numbers of these oils. The effect of time and temperature upon the swelling equilibrium has been discussed previously.

This paper is presented to show that the swelling effects of petroleum derived oils may be predicted by a simple test (aniline number). It is advocated that oils to be used in immersion tests in acceptance specifications be referred to by aniline number rather than by viscosity rating or some other physical constant which does not predict the swelling effect of the oil on the vulcanizate. Donald F. Fraser, Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

[1] *Ind. Eng. Chem.*, Mar. 1, 1940, pp. 320-23. Paper presented Sept. 11 before a joint session of the Divisions of Petroleum Chemistry, Paint and Varnish Chemistry, and Rubber Chemistry at the ninety-eighth meeting of the A. C. S., Boston, Mass.

An Immersion Test for Rubber Compounds. A die cut sample 100 mm. long (1.6 mm. wide and 0.64 to 3 mm. thick) is immersed in a liquid for any specified period of time and at any desired temperature in a glass tube 250 mm. long and 8 to 15 mm. diameter. After bringing to room temperature, the change in length, ΔL, is read in millimeters by placing the tube in the proper position on suitable graph paper illuminated from below. The corresponding per cent increase in volume, ΔV, is read directly from a prepared table.

With molded sheets, using the present apparatus and procedure, ΔV is reproducible within $\pm 1\frac{1}{2}\%$ up to approximately 50% and within $\pm 5\%$ at 200-300%. The principal sources of error are small variations in the length of the sample and small inaccuracies due to the apparatus. The former can be eliminated by measuring the sample before immersion or by improving the method of cutting. The latter can be largely eliminated by refinements in the construction of the apparatus.

The method is very sensitive to grain effects and for accurate work special samples will have to be prepared in which this effect is kept at a minimum. Conversely the test might be used as a measure of grain effect. The new test gives results which are close to, but not identical with those obtained by the present standard A.S.T.M. test. The measurements can be made five to ten times as fast, and calculations are eliminated. Hence this method has obvious advantages in many cases. This procedure is fast and simple. All weighings and calculations are eliminated. Volume change is determined without removing the sample from the liquid. Space requirements are small. With special graph paper the change in volume could be read directly. Special apparatus for fast, accurate measurement could be made at low cost. B. S. Garvey, Jr., B. F. Goodrich Co., Akron.

Theoretical Stress-Strain and Compression Curves for Rubber-Like Materials. A theoretical stress-strain curve has been derived for rubber-like mate-

rials built up from long chain molecules connected into a network by cross bonds. The essential properties of rubber which the model is designed to reproduce are the approximate incompressibility of the bulk material and the flexibility of the rubber chain molecules; the stress-strain curve follows from the application of statistical mechanics. The stress-strain relation for the model is

$$F = K\,[f(La) - L^{-3/2} f(L^{-1/2} a)]$$

Here F is the stress per unit initial cross-section and L the relative length ($= \frac{\text{extended length}}{\text{original length}}$; thus $L > 1$ for extension, $L < 1$ for compression.) $f(x)$ is defined by the relation $x = \frac{e^{2f}+1}{e^{2f}-1} - \frac{1}{f}$, and is most easily obtained from a graph. K and a, are constants characterizing the chain network, $\frac{1}{a}$ being the maximum value of L for the model. Therefore a will increase with increasing cure. For extensions much less than L^{max} the above relation reduces to

$$F = 3aK(L - \frac{1}{L^2})$$

This stress-strain curve is still simpler than any of the purely empirically proposed analytical stress-strain curves for rubber. It may be used in rubber technology, for instance, to obtain the pressure-compression curve, given the stress-extension curve, and *vice versa*. The theoretical stress-strain curves show fair to good agreement with equilibrium stress-strain curves taken at Notre Dame and elsewhere. Eugene Guth, University of Notre Dame, Notre Dame, Ind., and Hubert M. James, Purdue University, Lafayette, Ind.

Creaming of Rubber Latex. With the growing development of the direct application of latex in the rubber industry, increasing interest is being paid to the possible methods for latex concentration. Creaming is recognized as one of the most important methods for concentration now available. Although considerable work has been done to explain the phenomenon, a number of aspects need further clarification either to complete a generally acceptable picture or to settle differences of opinion between various investigators.

The work to be presented takes into detailed consideration the methods of preparation of the creaming agent, its concentration, and its adsorption in the latex particles. The mechanism by which clustering, the cause of stratification, takes place was also studied.

For the greater part of the work locust bean gum has been used as a creaming agent. The results show that for best results the creaming agent must be completely swelled before mixing with the latex. Appropriate mixing procedures are discussed. Using the most efficient methods of mixing it was possible to establish an optimum concentration of creaming agent at which the rubber concentration of the cream reached a maximum while the rubber concentration of the serum closely approached its minimum. This optimum was also observed when NH_4-alginate was used as creaming agent instead of locust bean gum. That locust bean gum is not adsorbed during creaming could be demonstrated by extensive viscosity measurements, thus eliminating those theories of clustering which are based upon adsorption.

Experimental evidence is given to show that an interaction between creaming agent and latex serum exists, which is of predominant importance in evaluating the mechanism of creaming. This greatly strengthens a theory based on destabilization of the rubber particles by dehydration caused by the added creaming agent. Further results point to an irreversible denaturization of the latex protein accompanying its dehydration. E. A. Hauser and B. Dewey, Jr., Massachusetts Institute of Technology, Boston, Mass.

Effect of Sulphur and Carbon Black Contents on Physical Properties of Perbunan Compounds. Perbunan is one of the newer synthetic rubbers scheduled for manufacture in the U. S. A. Its composition and most important attributes are outlined very briefly. The similarity of Perbunan compounding as compared to that of natural rubber is outlined in some detail. It is pointed out that as with natural rubber, sulphur is required for vulcanization and likewise that the various carbon blacks produce enormous reenforcement of Perbunan. While these statements are true in a qualitative sense, there is a great difference in quantitative results between Perbunan and natural rubber.

Experimental data in the form of tables and charts will be given to illustrate the influence of varying percentages of sulphur in a typical Perbunan compound as demonstrated by the resultant physical tests and aging characteristics of the vulcanized compounds. The three most prominent types of carbon blacks are similarly treated. Tables and charts will demonstrate the effect of a wide range of loadings of hard, highly reenforcing channel blacks, semi-reenforcing blacks, and a soft black upon the commonly determined physical properties of a commercially useful Perbunan compound.

The data presented will demonstrate plainly the desirability of holding the sulphur content of a Perbunan compound to a maximum of 2% sulphur on the weight of the Perbunan for all save special purposes. The data on the effect of the various carbon blacks permit immediate determination of the amount of any of the blacks required in a normal-type Perbunan compound to secure any desired physical strength, hardness, modulus, or other common physical requirement obtainable through the use of these fillers. C. A. Klebsattel, Advance Solvents & Chemical Corp., New York, N. Y.

Vistanex Polybutene—Rubber Blends. The introduction outlines briefly the characteristics peculiar to the high-molecular-weight polybutenes marketed as Vistanex. Similarities in physical properties as compared to unvulcanized natural rubber are presented. Differences between polybutenes and natural rubber are cited to show that outright replacement of natural rubber by polybutenes is not permissible for many applications.

Use of reenforcing fillers with polybutenes to gain better physicals is described, and some applications for these simple compounds are given.

The polybutenes have very valuable characteristics which make them desirable partial replacements for natural rubber for many classes of service. The bulk of the paper is devoted to describing the results and tests made upon numerous blends of Vistanex Polybutene and rubber to demonstrate the results which may be obtained. Data are presented to illustrate the influence of different types of reenforcing fillers, milling procedures, and processing methods upon the physical properties of the final vulcanized compounds. Practical limitations on the limits of replacement of rubber by the polybutenes for various classes of service are discussed, and recommendations for various applications are made.

The use of rubber ebonite as a reenforcer of the polybutenes is described, and suggested applications for these blends are given. Actual compounds and test data together with special procedures for their proper preparation are explained.

The paper concludes with a description of results obtained by blending high-molecular-weight polybutenes with cyclized rubber or Pliolite. S. Longman, Advance Solvents.

A Torsional Hysteresis Test for Rubber. A torsional hysteresis test for rubber is described. The test piece consists of a small, die-cut dumbbell. The shank is 3.8 cm. long (1.5 in.) and uniform in section, roughly 2.5 mm. square (1/10-in.). The upper end of the test piece is fixed. From the lower end hangs, by a short vertical shaft, a light, graduated aluminum circle. The sample and circle thus constitute a torsional pendulum. From visual observations of the amplitude decay in the freely oscillating pendulum, hysteresis is calculated as the common logarithmic decrement. Modulus of rigidity can be calculated from the frequency of oscillation.

Some typical experimental results are given which show the sensitivity of torsional hysteresis to cure, temperature during the test, and to certain compounding ingredients. With tread stocks containing a variety of channel blacks, very close correlation is found between torsional hysteresis and per cent rebound.

The main advantages of this torsional hysteresis test lie in its simplicity, its low cost, and in the fact that the sample does not have to be especially

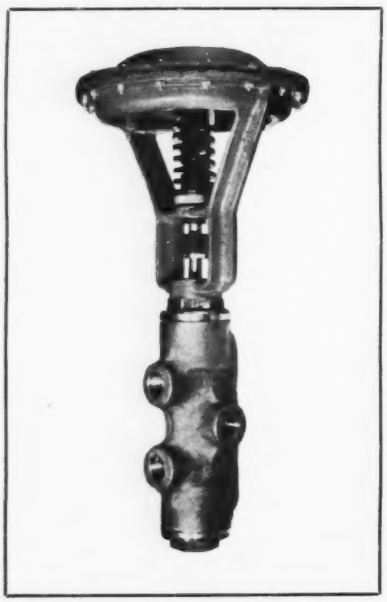
(*Continued on page 78*)

New Machines and Appliances

Model 486 Electronic Pyrometer Controller

Bristol's New Electronic Pyrometer Controller

THE Bristol electronic pyrometer controller (Model 486) consists of two separate units: a millivoltmeter pyrometer unit which measures and indicates on a scale the temperature under control; and a control circuit which opens and closes a relay in the load circuit that regulates the fuel supply to the furnace, oven, or kiln. There is no mechanical or electrical connection between the two units. Automatic control is accomplished electronically by means of an oscillatory circuit and a high output vacuum tube. Moving parts, such as motors, depressor bars, toggle switches, and contacts are said to be completely eliminated from the control circuit. The temperature ranges to which the controller may be applied are from 0°-500° F. up to 0°-3000° F. The Bristol Co., Waterbury, Conn.

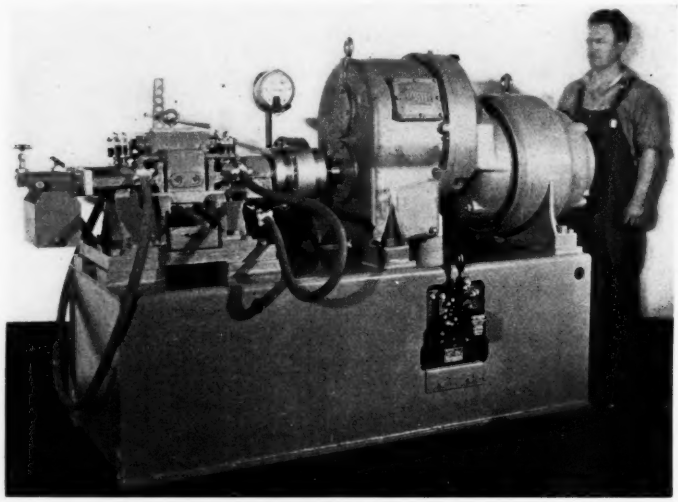


Seely Diaphragm-Operated Four-Way Hydraulic Valve

Diaphragm-Operated Hydraulic Four-Way Valve

IN THIS diaphragm-operated four-way hydraulic valve the Sea Ring packings do not pass over port openings, but are so located that they are not subjected to high hydraulic pressure. They are even protected against the flow of water. The seats are of monel metal, said to be hard enough for severe service and yet just soft enough to "wear in" properly.

In operation, air pressure is applied above the diaphragm to exhaust the top valve cylinder connection and open the bottom cylinder connection to the hydraulic pressure. By exhausting the air pressure over the diaphragm, the reverse of this procedure takes place. During the stroke the outer valve disk seats first and then telescopes on the inner disk until the latter comes to seat. As the valve moves from port to port, all disks are skirted, which action is said to prevent the flush of pressure water to the sewer and to flush the seat faces clean before each setting. The valve may be used for either hand or automatic operation. Seely Instru-Co., Inc., Akron, O.



Farrel Size B. Banbury with Four-Speed Motor

Laboratory Banbury Mixer Equipped with Four-Speed Motor

THE Banbury mixer, illustrated, is size B, one of three sizes for laboratory use. The unit has a four-speed motor which permits the testing of the effects of four different speeds on different types of rubber stock. Size B has a capacity of two pounds of crude rubber and a correspondingly greater capacity for stocks of higher specific gravity.

The two mixing rotors are fitted with end thrust adjustment, and there are two steel sheeting rolls on the extended rotor shafts outside the mixing chamber to permit sheeting of the material after mixing. Mixing rotors and the mixing chamber are jacketed for heating or cooling, with provision for the circulation of either steam or water. Both the front and the rear sides of the mixing chamber can be opened for complete access when unloading and cleaning.

Cooling water discharge is taken care of by an open tank. A small, hand-operated floating weight is provided, and no compressed air is required to operate the machine.

The drive is by a four-speed, double parallel, geared head motor, mounted on the bedplate of the mixer and connected to it by a flexible coupling. The motor provides speeds of 80.8, 119, 158, and 242 revolutions per minute, and the horsepower varies accordingly from 8½ to 25.

These laboratory mixers are designed on the same principles as the larger production models, but have been simplified to adapt them for laboratory use. In addition to their use for experimental mixing of small batches of rubber, the mixers can also be employed for solutions of various kinds and for asphaltic materials, phenolic condensation products, resinous compounds, paints, enamels, lacquers, and other plastic materials. Farrel-Birmingham Co., Inc., Ansonia, Conn.

New Goods and Specialties

One-Gallon Fyr-Fyter Extinguisher Equipped with Resistoflex Hose

Fire Extinguisher Utilizes Resistoflex PVA Hose

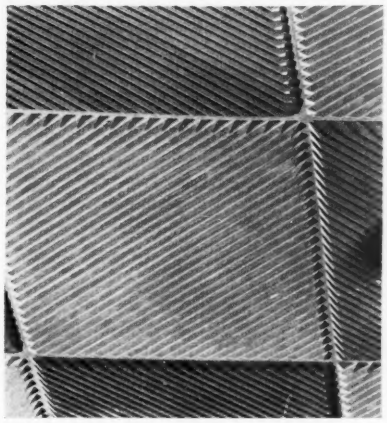
FYR-FYTER fire extinguishers are being equipped with a discharge hose, comprising a tube of Resistoflex PVA (flexible polyvinyl alcohol composition), a single braided fabric reenforcement, and a synthetic rubber cover. The new hose, which replaces a metal-lined and rubber-covered hose, is a special type of Resistoflex PVA "Super-Chemical" hose, said to be unaffected by carbon tetrachloride and to retain its flexibility under all atmospheric conditions and temperatures. The service life of the hose has been estimated to be from 15 to 20 years. The discharge hose is made by the Resistoflex Corp. for the manufacturer of the extinguishers. The Fyr-Fyter Co.

Koroseal-Treated Light-Weight Silk Gloves

"HANDI-MITTS" are gloves made of light-weight silk and treated with Goodrich's Koroseal to make them waterproof, acid proof, fire resistant, and grease proof. The glove is offered for general utility purposes as a protection while gardening and driving and for housework. Stains may be removed by wiping with a damp cloth. Keko Products Division of the Kennedy Car Liner & Bag Co.

Tu-Tone Rubber Rug Made by Goodyear

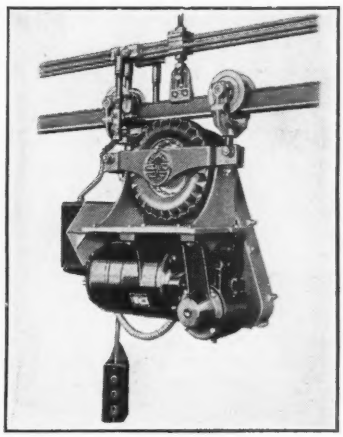
A HEAVY-DUTY rubber rug, identified as the Tu-Tone, is made up of nine- by 12-inch panels with a diagonal rib design. The direction of the ribs is reversed in succeeding panels to give the Tu-Tone effect. The rug has an overall thickness of $\frac{1}{16}$-inch and is made in rolls 54 inches wide and 30 feet long. Colors are black, red, or green. The Goodyear Tire & Rubber Co.



Goodyear Tu-Tone Rug

Rubber-Tired Motoveyor

A RUBBER tire is utilized on the drive wheel of the Motoveyor, a powered machine for automatically transporting loads over an overhead track system. Capable of negotiating inclines, the Motoveyor maintains uniform speed going down grade. The range of speed which can be provided is from 60 to 600 feet per minute. The drive shaft is supported in precision ball bearings, located on each side of the rubber-tired wheel. The main frame is cast in one piece, and the motor is mounted under this frame. Louden Machinery Co.



Louden Motoveyor

Mall Pneumatic Sanding Drum

Sanding Drum Equipped with Inner Tube

THE Mall pneumatic sanding drum for metal and wood working has an aluminum hub, over which is a clincher-type inner tube and a protective rubberized fabric band. On the outside there is an abrasive band, held in place by the inflation of the air tube. The tube is inflated through an air valve by means of a small hand pump. The soft air cushion effect of this construction is said to eliminate chatter and to provide a clean, even cutting action, resulting in finer finishes.

Another type of drum utilizes a soft rubber sleeve, with variations in softness obtained by adjusting a clamping screw which operates a mechanical expanding device. Mall Tool Co.

"Skin-A-Cat" Respirator

Respirator with a New Type of Filter

THE "Skin-A-Cat" respirator, which carries the approval of the U. S. Bureau of Mines for type "A" or pneumoconiosis (silicosis) producing dusts, utilizes a new-type filter construction which does away with metal retaining plates. The filters are stitched, turned inside out ("skin-a-cat"), and attached to the rubber face piece by means of tubular connections. This construction is said to provide over 40 square inches of clear breathing area. The respirator weighs less than five ounces and has special inhalation and exhalation valves to prevent rebreathing of the air and to prevent collection of moisture. H. S. Cover.

UNITED STATES

Industry at Active Pace

Instead of the usual seasonal letdown, industry in general last month improved, but at not so rapid a pace as in the early summer. Some disagreement exists regarding possibilities for the balance of the year; yet the majority of experts anticipate continued expansion.

Sales of heavy electrical equipment, at a new high for 1940 in June, were the best since mid-1937. With the boom now well under way, the electrical manufacturing industry this year expects to break all previous records in total volume of business done. The value of new building in July was the highest in a decade. After declines earlier in the month gains later were registered for power, oil, and lumber output, the cotton mill rate, and carloadings. Tin, however, dropped to 58%; and steel, after reaching 91%, eased to 89.5%, but then went to 91.3%, the highest for the year.

Automobile output last month was at the low of the year, with manufacturers busy with 1941 models, a few of which were shown. Late in August, however, an upturn began, which is expected to run through September. Dealers were said to be sacrificing profits to clear floors for new models. Expectation of higher prices has also stimulated sales. For the first seven months of 1940 factory sales of passenger cars and trucks are estimated at 2,776,740 units, 22% above the figure for the same period last year; retail sales, 2,524,841, 28.3% above those for the first seven months of 1939.

The rubber industry in August operated at about the same rate as in July, with, however, a tendency toward the fall pick-up noted late last month, due, in part, to the earlier-than-usual new model production by automobile manufacturers. This stimulated mechanicals output also, particularly of automotive rubber goods. Footwear held better than customary this summer; while insulated wire continues good. Tire replacement sales ran at about the July level in August, which, though, was under last year's business. The index of the value of rubber manufacturers' inventories of rubber products has declined slightly; while that of shipments has been rising steadily.

CALENDAR

Sept. 12-13. Rubber Division, A. C. S. Annual Meeting. Book-Cadillac Hotel, Detroit.

Oct. 7-11. National Safety Council. 29th Annual Safety Congress and Exposition. Stevens Hotel, Chicago.

Oct. 8. Los Angeles Rubber Group. Mayfair Hotel.

Oct. 12-19. National Automobile Show. Grand Central Palace, New York.

Nov. 8-9. Industrial Management Society. 3rd National Time and Motion Study Clinic. Chicago Towers Club, Chicago.

Dec. 2-5. A.S.M.E. 61st Annual Meeting. Hotel Astor, New York.

Dec. 2-7. 14th National Exposition of Power & Mechanical Engineering. Grand Central Palace, New York.

EASTERN AND SOUTHERN

Department of Agriculture Appropriation on Rubber

A recent *Rubber News Letter* from the United States Department of Commerce, Washington, D. C., reports that the appropriations bill, as finally amended, June 22, contained the following item for the Department of Agriculture:

"Rubber investigations: To enable the Secretary of Agriculture to conduct investigations directed toward the development of rubber production in the Western Hemisphere, including production, breeding, and disease research; surveys of potential rubber-producing areas; establishment and operation of experiment and demonstration stations in suitable locations; acquisition of land for such purposes; construction and equipment of necessary buildings; travel; purchase, maintenance, operation and repair of motor-propelled and horse-drawn passenger, carrying vehicles; employment of guides, translators, and other assistants by contract or otherwise, medical services; books, periodicals, and newspapers; rent; printing; and for all other necessary expenses, including personal services and means in the District of Columbia and elsewhere, fiscal year 1941, $500,000, to be immediately available and to remain available until expended; Provided, that the Secretary of Agriculture is authorized to transfer such sums as he may deem necessary to other Government agencies cooperating or assisting in such investigation."

Originally one million dollars was asked. This request, however, was omitted by the House; but the Senate, after favorable testimony by the National Defense Council, amended the bill to include $500,000 as above.

Survey Begun

On August 6, Secretary of Agriculture H. A. Wallace announced that the survey of tropical Americas to determine the most promising rubber producing areas has begun, and two exploration parties already are at work. The Latin-American republics involved are cooperating.

One party, at work in southeastern Central America and parts of Colombia, is headed by O. D. Hargis, rubber specialist formerly with the International and Goodyear rubber companies in Malaya, Sumatra, and Central America. With him are Dr. R. C. Lorenz, plant pathologist of the U. S. Department of Agriculture who has had research experience at the Firestone plantations in Liberia; M. M. Striker, soils specialist of the Bureau of Plant Industry, who has made soils survey and land-use studies in Puerto Rico; and Dr. R. J. Seibert, botanist from the Missouri Botanical Gardens, St. Louis, and an authority on tropical American plants.

Another group, covering northwestern Central America as far north as Vera Cruz, Mexico, is headed by Dr. Mark Baldwin, soils man from the Bureau of Plant Industry, who has made rubber surveys in the Philippines and Latin America. With him are Dr. T. D. Mallory, botanist from the Carnegie Institution, with ten years of exploration experience in Mexico; Dr. T. J. Grant, pathologist from the U. S. Department of Agriculture, formerly with the United Fruit Co. in Honduras and Guatemala; and R. E. Stadelman, explorer and agriculturist with a decade of tropical experience.

A third party, led by Dr. E. C. Stakman, pathologist, head of the Department of Botany and Plant Pathology of the University of Minnesota, and agent of the Bureau of Plant Industry, is on its way to survey an area roughly covering the headwaters of Amazon tributaries—an area east of the Andes in Colombia, Peru, Brazil, and Bolivia. Others in the party are Earl M. Blair, rubber technologist, formerly with U. S. Rubber in Sumatra; A. F. Skutch, botanist; and Dr. Hollmut de Terra, geologist and soils expert.

Eventually the surveys will take in an area extending from Vera Cruz, Mexico, to Rio de Janeiro, Brazil, on the southern edge of the Atlantic rain belt. Observations made in these surveys, together with the Department's already extensive knowledge of rubber growing in this hemisphere, will serve as a basis for determining, in cooperation with the countries involved, the locations of at least two experimental bases to be established in the most promising areas.

Results of the rubber survey and experimental work that follows will be available to any American republic and to both large and small growers. Government research will be invaluable to commercial production, Mr. Wallace also said, and commercial plantings by large concerns will supplement research.

Under average conditions it is estimated that large areas of the Americas could be in rubber production within ten years. Rubber specialists believe there are millions of acres in tropical America as well adapted to growing rubber as the eight million acres now in rubber in the Far East. After all, *Hevea* originally came from Brazil. It is estimated that *Hevea* rubber can be produced in tropical America at a cost of not more than half of what it will cost to produce synthetic rubber, guayule rubber, goldenrod rubber, or other substitutes, even with large-scale production. It is possible that through research more use may be made of the Castilla rubber tree, which grows in the colder, drier climates on the fringes of the tropics.

It must be emphasized that the object of the surveys is not reports, but the collection of special seeds, budwood, and propagating material of outstanding or disease-resistant types for propagation and study at stations to be established for actual experimental work. The Department hopes that the surveys and collections may result in the initiating of actual rubber plantings.

Rubber Exports under License

The Presidential Proclamation of July 2, 1940, decrees that effective July 5, 1940, "rubber" shall not be exported from the United States except when authorized in each case by a license, which the Secretary of State is empowered to issue or refuse in accordance with such specific directives as may be communicated to him from time to time by the Administrator of Export Control. Regulations define "rubber" as "all forms and types of crude rubber, reclaimed rubber, and scrap rubber containing in excess of 5% rubber," and the regulations also state: "Except as otherwise indicated the terms used in these regulations shall not include completely fabricated articles or materials which are ready for ultimate consumption." Violations are subject to prosecution.

Applications for license to export should be directed to the Division of Controls, State Department, Washington, D. C., and all inquiries or interpretations of the proclamation should be directed to that division.

Pocono Co. Sold

Sale of the Pocono Co., Trenton, N. J., to the National Automotive Fibre Corp., Detroit, Mich., was announced by Victor S. Pollak, Pocono president. The Pocono plant, purchased at an unrevealed figure, will become the seventh operated by Automotive Fibre.

Pocono formerly supplied the purchasing corporation with sponge rubber mats for use in automobiles and did other business in rubberized fabrics. It will now specialize on carpets exclusively. Orders are on hand for running six months at capacity. Automotive Fibre has been using some rubber in its out-of-town plants, but will use rubber now manufactured at the Pocono factory.

Mr. Pollak, who will become general manager at the Pocono plant, says its officers will continue to serve until the company is liquidated, in about two months. Joesph J. Pugh is vice president, and Joseph J. Kiefer is secretary-treasurer. Pocono Co. currently employs 70 men in its plant and ten office workers.

J. H. Grut, secretary-treasurer of National Automotive Fibre Corp., in Trenton to complete negotiations, said he expected an increase in the Trenton plant's payroll if business continues to improve.

Standards Adopted for Tire Advertising and Selling

At a meeting of representatives of the automobile tire trade and industry, held on June 5, 1940, by the Better Business Bureau of New York City, Inc., 280 Broadway, New York, N. Y., certain standards for tire advertising and selling were adopted. This action is in line with that taken by several newspapers in St. Louis, as reported in our July issue (page 59). The Better Business Bureau now reports that the industry in general has been very receptive to these standards, and it is considered that worthwhile progress is being made toward the elimination of confidence-destroying and unfair practices. The standards adopted on June 5 are as given below.

1. No statement or representation shall be used in advertising tires or prices, which has the capacity or tendency to mislead or deceive the customer.

2. The term "list prices" or the quoting of manufacturers' list prices shall not be used for comparison purposes in advertising tires to the public, unless such list prices are the usual prices at which the tires have been selling at retail in this area.

3. Claims of "savings," "discounts," trade-in allowances, or specific percentages "off" of former prices, shall be based only on the usual, every-day prices at which the tires have been selling at retail in this area.

4. Advertised trade-in allowances if stated in specific amounts or percentages shall be limited to a reasonable percentage of the usual selling prices of the tires offered for sale.

5. Price claims shall not be used which compare a special sale price of a particular tire with the list price or former list or selling price of another tire of a higher price level, brand, or quality.

6. No other item or items shall be offered as a gift or bounty with the sale of a tire when the advertised or sale price of the tire is greater than the usual price at which the tire has been selling at retail in this area.

7. "Bait" practices, by which well-known makes of tires are advertised mainly as a means to sell other makes in which the advertiser specializes, shall not be used.

8. When time payments and/or terms are quoted in connection with stated prices, the advertisement shall conspicuously state that a carrying charge is added unless the advertised price is the time-selling price.

9. The terms "custom-built," "custom-made," "custom-grade," etc., shall not be used in the advertising, selling or labelling of tires, unless the tires so designated are actually made on the specifications of the customers who buy them.

10. When a guarantee is mentioned, it shall be clearly stated in terms of the duration of such guarantee and the nature of it.

Supply Contracts Awarded

Among the recent listing of supply contracts awarded by the United States through its various departments were:

Navy: *cable,* Anaconda Wire & Cable Co., New York, N. Y., $113,249; *hose,* United States Rubber Co., New York, $33,751; *sodium nitrate,* Barrett Co., New York, $29,400; *titanium barium,* Titanium Pigment Corp., New York, $86,220; *wire,* Anaconda, $48,028, Crescent Insulated Wire & Cable Co., Trenton, N. J., $32,732, Okonite Co., Passaic, N. J., $48,028, John A. Roebling's Sons Co., Trenton, $46,-935.50; *zinc,* New Jersey Zinc Sales Co., Inc., New York, $36,001.

Panama Canal: *cable,* Phelps Dodge Copper Products Corp., Habirshaw Cable & Wire Division, New York, $18,397; *valves,* Jenkins Brothers, Bridgeport, Conn., $12,059.

War: *cable and reels,* General Cable Corp., New York, $89,941, Okonite, $27,-350; *hose,* U. S. Rubber; *raincoats,* Archer Rubber Co., Milford, Mass., Cable Raincoat Co., Boston, Mass., Sigmund Eisner Co., Red Bank, N. J., Hodgman Rubber Co., Framingham, Mass., Marathon Rubber Products Co., Wausau, Wis., U. S. Rubber; *razors,* Vulcanized Rubber Co, Morrisville, Pa, $20,760; *shaving brushes,* Rubberset Co., Newark, N. J., $13,320; *webbing,* Russell Mfg. Co., $45,-685; *wire,* Circle Wire & Cable Corp., Maspeth, L. I., $254,966.

Aliens Must Be Registered

The Alien Registration Act of 1940 requires all non-citizens to register in post offices throughout the country during a four-month period from August 27 to December 26, 1940. This nation-wide registration, estimated to cover more than 3,500,000 aliens, adopted as part of the national defense program, is being conducted by the Immigration and Naturalization Service of the United States Department of Justice.

The law requires that all aliens 14 years or older be registered and fingerprinted. Children under 14 must be registered by their parents or guardians. When alien children reach their fourteenth birthday, they must register in person and be fingerprinted. A fine of $1,000 and imprisonment of six months is prescribed for all non-citizens who fail to register, refuse to be

fingerprinted, or who make registration statements known to be false.

The Alien Registration Division, which is distributing more than 5,000,000 specimen forms listing the questions asked of aliens at registration, to facilitate matters urges that aliens fill out these forms and take them to the post office.

E. I. du Pont de Nemours & Co., Inc., Rubber Chemicals Division, Wilmington, Del., has just produced a new sound motion picture about neoprene, showing how it is made, explaining its chemical formula by animated cartoons, giving interesting tests of the material, and picturing hundreds of applications of products made from it. This 20-minute film for a 16 mm. sound projector is available without charge to any organization.

Parazin Printing Plate Co., Burke Building., Rochester, N. Y., manufacturer of rubber printing plates, recently underwent complete reorganization and incorporation to secure better distribution of its products and more capital. An expansion program is also being conducted. New officers of Parazin Printing Plate Co., Inc., follow: president, Geo. W. Stacy-Bush; vice president, Milton J. Firey, Jr.; secretary, Craig C. Smith; treasurer, V. M. Stacy-Bush. Mr. Firey, who now has a financial interest in the business, formerly was with General Motors (Delco and Frigidaire divisions) and *Iron Fireman,* where he gained broad experience in sales and distribution methods.

John A. Roeblings Sons Co., Trenton, N. J., has added to its staff as assistant chief chemist in the insulated wire division James E. Flood, formerly chief chemist at the Whitney Blake Co., New Haven, Conn.

The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J., has installed what is believed to be one of the largest vulcanizers in use by a rubber factory, for vulcanizing rubber-lined tanks and other equipment for their resistance against corrosive liquids and to prevent contamination to the processed substances. This vulcanizer, measuring 15 feet in diameter, will enable the company to handle industrial equipment of greater magnitude for rubber lining of almost every description. In it can be accommodated practically any piece of equipment that can be shipped by rail.

L. Albert & Son, dealer in rubber machinery, Trenton, N. J., reports export trade has declined considerably because of war conditions, but domestic business continues very good, with many orders on hand for the Trenton, Los Angeles, and Akron branches. I. H. Albert, head of the concern, recently returned to Trenton after spending some time at the California plant, to which he will return in three months.

Martindell Molding Co., Trenton, N. J., continues to run 24 hours a day. Harry P. Koenneke, secretary and general manager, was West on an extended business trip.

Most rubber companies in Trenton, N. J., report increased business for the past few weeks. Jos. Stokes Rubber Co. is operating with three shifts, and its Canadian plant also is very busy. The Puritan Rubber Co. is experiencing better demand for rubber tiling; while conditions have also improved in hard rubber goods at the Luzerne Rubber Co. and Vulcanized Rubber Co., and Whitehead Bros. Rubber Co. also finds business better with all its products.

A. Boyd Cornell, secretary-treasurer of the Hamilton Rubber Mfg. Co., Trenton, N. J., has returned to his duties after having been confined to his home by a serious illness.

Mercer Rubber Co., Hamilton Square, N. J., finds business better in all lines. The engagement has been announced of Miss Hannita B. Janney and William Henry Sayen, 3rd, son of the Mercer company's secretary and factory manager, Fred R. Sayen, with whom the young man is associated.

Charles E. Stokes, Sr., president, Home Rubber Co., Trenton, N. J., spent a month at his summer home at Spring Lake, N. J.

Essex Rubber Co., Trenton, N. J., is operating normally. L. M. Oakley, vice president and sales manager, toured New England on business. The company on August 10 held its annual outing at the Trenton Fair grounds for employes and their families. There were various athletics and dancing with refreshments during the day. Some Essex officials attended.

OHIO

Firestone Anniversary

On August 3 the Firestone Tire & Rubber Co., Akron, celebrated its fortieth birthday. Part of the festivities included a celebration at the company's exhibit at the World's Fair in New York, when the entire production of the Firestone tire factory was devoted to making tires with synthetic rubber in the interest of national defense. Vice President Harvey F. Firestone, Jr., son of the late founder, in addressing the gathering on the importance of rubber in national defense stated that the company is building an enlarged plant for the manufacture of synthetic rubber at Akron. He further revealed that more than eight years ago Firestone began experimenting with various types of synthetic rubber, studying their characteristics and using them in the manufacture of finished products, and that as far back as May, 1933, the company produced synthetic rubber tires and was the first concern to provide this nation's armed forces with tires made of synthetic rubber.

John W. Thomas, Firestone President, (Left), on the Company's Fortieth Birthday, Showing Harvey S., Leonard K., and Russell A. Firestone, a Carriage Tire upon Which the Business Was Started, Compared with the World's Largest Tire (Almost Nine Feet High, Weighing 2,640 Pounds, and Capable of Carrying a Load of 22 Tons) Now in Regular Production at the Akron Plant

Mr. Firestone also cited a number of the company's other contributions to the rubber industry; the development and production of the first straight-side tire in 1904; the first design and building by a manufacturer of a tire with an all-rubber non-skid tread, 1907; the Gum-Dipping Process, 1916; introduction of the first practical low-pressure tire for farm tractors, 1922, and of the first balloon tire, 1923.

Annual Outing

Firestone factory and office employes on August 9 participated in the Firestone Annual Outing held again at Cleveland's Euclid Beach. An elaborate sports program, swimming, dancing, special events, as bathing beauty contests, and free concessions, including amusements and refreshments for children, highlighted the event.

The Ohio Rubber Co., manufacturer of automotive, molded, and extruded rubber products, Willoughby, has started a new addition, the second part of a compounding and raw material storage building, the first half of which was completed in January, 1938. The structure, three stories high, 90 by 190 feet, of brick and steel with a new elevator, is scheduled for completion about October 1 and will cost approximately $125,000. President Franklin G. Smith stated that a chief factor in undertaking this work was to make available additonal manufacturing space by transferring storage from present manufacturing buildings in order that the company may be better prepared for its part in the nation's rearmament program.

Goodyear Announces Chemigum, Its New Synthetic; Litchfield Resigns; Thomas Now President

Edwin J. Thomas

Paul W. Litchfield, who recently celebrated his sixty-fifth birthday and his fortieth anniversary with the Goodyear Tire & Rubber Co., Akron, resigned, effective September 1, as president of the company, a post he has held since 1926, but will continue as chairman of the board of directors. The board, on August 12, accepted his resignation and elevated Executive Vice President Edwin Joel Thomas to the presidency. Mr. Litchfield will continue to be the senior active executive of the company and primarily responsible for the creation of policy; while Mr. Thomas will be concerned with the execution of policy. Mr. Litchfield himself suggested this rearrangement of management.

Mr. Thomas was born in Akron, April 27, 1899, and after graduating from Central High School there in 1916, took a special course at the University of Akron. He then secured employment as a stenographer in the Goodyear laboratory and in 1918 was made secretary to Mr. Litchfield, who then was factory manager. Mr. Thomas became assistant to the factory manager in 1920; manager of the flying squadron, 1922; assistant to the president and manager of the personnel department, 1926; general superintendent, vice president, and director of the Goodyear Tire & Rubber Co. of California, 1928; director of Goodyear Textile Mills, 1928; assistant to Factory Manager and Vice President C. Slusser, at Akron, 1930; general superintendent at Akron, 1932, managing director of the plant at Wolverhampton, England, 1935; assistant to President Litchfield, 1936; executive vice president and a director of the Goodyear Tire & Rubber Co., 1937; executive vice president, Goodyear Foreign Operations, Inc., 1939.

Increases Synthetic Rubber Production

An announcement on August 22 by Mr. Litchfield revealed that Goodyear has been developing and producing its own type of synthetic rubber, known as Chemigum, for the past three years in its laboratories and in a small pilot plant. Also announced was the limited production of Chemigum tires and an immediate and substantial increase in facilities for the manufacture of Chemigum itself. A new plant, with an initial capacity of 10,000 pounds per day, will be installed at Akron in space made available within the company's existing buildings.

Chemigum is derived from petroleum, through a cracking process, and is the culmination of extensive work by Dr. R. P. Dinsmore, in charge of all development and research, and Dr. L. B. Sebrell, manager of chemical research for Goodyear. Several years were required in the development and exploration of more than 300 different compounds before Chemigum was produced. These 300 original compounds were narrowed down to 70 which gave fair results. Further experimentation reduced the list to ten basic compounds, which in turn were later reduced to four. Numerous patent applications have been filed to cover Chemigum manufacturing processes.

Among the advantages claimed for Chemigum are: increased tensile strength; resistance to aging, abrasion, and oils; and the fact that it may be processed more easily than Buna, utilizing in general the same production methods and equipment currently in use with natural rubber. Chemigum is said to be much more resistant to oxidation than natural rubber and to have possibilities for blending with natural rubber.

Tires of the new synthetic are said to give superior performance to those made of German Buna and equal to those made of natural rubber. They have been tested in the laboratory and on the road in a program conducted since 1937. Chemigum is being used in the manufacture of gasoline hose, airplane brakes, gaskets, sealing rings, and other Goodyear products.

In making the announcement, Mr. Litchfield said: "At present Chemigum costs more than natural crude rubber. Its use in general commercial manufacture will be quite limited in the near future unless a national crisis should develop."

In this connection it was explained that the company has complete plans for further large expansion in the event of such an emergency.

Aircraft Activities

During July and August, the Goodyear company had on display at the Air Defense Exhibition in Pittsburgh, Pa., at Buhl Planetarium and Institute of Popular Science, its aircraft booth (from Akron), featuring tires, tubes, brakes, wheels, and rubber boats for aircraft, tying in with the purpose of the Pittsburgh displays to propagate the needs and possibilities of air defense. The booth, originally scheduled for July only, is the same exhibit that was viewed by 185,000 persons in May, at Washington, D. C., at National Aviation Forum's 1940 event, sponsored by National Aviation Association at Bolling Field.

Goodyear is making available to its employes an opportunity to receive ground school and flight instructions necessary to obtain a free ballooning and transport airship pilot license. Applicants must be Goodyear employes between the ages of 19 and 30, have had at least two years of college education and have passed the standard physical examination established by the Civil Aeronautics Board. To fill what appears to be an immediate need of lighter-than-air pilots the company, assisted by Akron University, has already started a class of 15 men for training. Ground school started at Akron U. late in August; work consists of 150 class hours, eight hours a week at night school, to be completed in five months. Flight instructions begin at Wingfoot Lake, September 1, under the direction of Goodyear airship pilots. The flying instructions course includes

Drs. Sebrell (Left) and Dinsmore (Right) with a Tire of Chemigum

ten hours of free ballooning training and 200 hours of actual airship flying instruction. Tuition for ground school is $50 plus additional cost of textbooks. Students passing the course with a grade of 70 or better will be refunded their tuition fee. The course is sponsored entirely by Goodyear; but when transport airship pilot licenses are obtained, the students then will be qualified to take examinations for commissions in the United States Naval Reserves.

Fifth airplane to be owned and operated by Goodyear for use in design, development, test, sales, and service work on airplane tires, tubes, wheels, brakes, and controls, is a new, recently purchased Waco, Model E Aristocrat, powered with a 45 h.p. Pratt & Whitney Wasp Jr. engine. The ship is a four-place job, fitted for travel and equipped for all types of flying. It is well-instrumented and decorated in the company colors, blue and yellow, also bearing the company's house-flag as insignia. Optimum altitude of the craft is 9,500 feet; cruising speed, 197 miles per hour. Tires are 8.50-10 Goodyear airplane All-Weather Tread; wheels and brakes, the Goodyear disk type of hydraulic.

Sales-engineer and pilot of the ship is Clarence O. Bell, flying Goodyear airplanes 11 years, and before that a mail pilot. Associated with him, as manager of Goodyear Airplane Division, is Larry O. Guinther, also licensed pilot, flying since 1918, when he was an observer during the World War.

Interstate Welding Acquires Larger Plant

To meet the steadily growing demand for its complete Banbury mixer rebuilding service, The Interstate Welding Service has acquired new and larger factory quarters in Akron, with expanded welding and machine shop facilities. The new address is 914 Miami St., where an enlarged crew of expert welders and machinists is busy rebuilding and hard-surfacing Banbury mixers of all sizes, for rubber manufacturers in many parts of the country.

With its increased facilities Interstate Welding Service is equipped for speedy Banbury rebuilding work and has its own machine shop with modern equipment capable of handling Banbury rotors up to and including the largest No. 27 size, officials state.

Established more than seven years ago, The Interstate Welding Service specializes in Banbury rebuilding work, using its own exclusive welding process, and completely rebuilding every mixer, and replacing bearings, dust rings, wearing rings, etc.

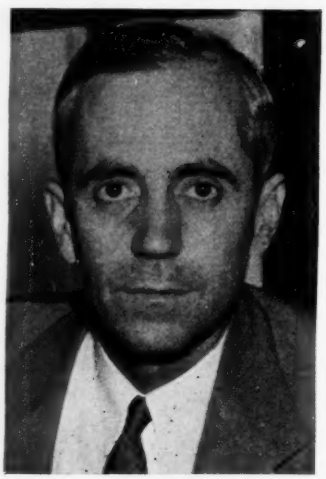
One of the firm's special services to the rubber industry is rapid airplane consulting service. The Interstate airplane is kept ready at the Akron airport, for quick use of Interstate officials in speeding to various rubber plants for consultation and to give estimates on Banbury rebuilding jobs.

Goodrich and Phillips Form Synthetic Rubber Company; New Koroseal Plant in Construction

The formation of the Hydrocarbon Chemical & Rubber Co. to manufacture the principal ingredients of synthetic rubber from various natural raw materials and the synthesis of such rubbers was announced on July 31 in a joint statement by David M. Goodrich, chairman of the board of The B. F. Goodrich Co., Akron, O., and Frank Phillips, chairman Phillips Petroleum Co., Bartlesville, Okla. The new company will wholesale synthetic rubbers in sheeted form to Goodrich and other firms in the rubber industry. It is understood that for present all research and manufacturing will be conducted in Akron, where the firm's offices are located, and that the new company will not use the trade name "Ameripol," the synthetic rubber announced by Goodrich on June 5.

In the formation of the new firm, according to the announcement, Goodrich and Phillips are combining their facilities for the manufacture of synthetic rubber so that additional commercial quantities can be made promptly available for use in national defense and throughout industry. Phillips Petroleum has a strong patent position in the processing of petroleum hydrocarbons and possesses immediate supplies and vast reserves of the raw materials used in the manufacture of synthetic rubber, it was pointed out; while Goodrich is already manufacturing synthetic rubber after 14 years of laboratory research in this field.

Manufacturing facilities are being rapidly expanded, it was stated, so that samples of materials and detailed technical information relating to military and industrial uses of the new substances may be put in the hands of prospective users. The speed with which the company plans to increase its production has been made practical, it was explained, because of the rapid strides within the past few months in developing compounds of these new materials for a large number of commercial needs.



Ross W. Thomas

The directors of Hydrocarbon Chemical & Rubber representing Phillips Petroleum are Mr. Phillips, K. S. Adams, president, and G. G. Oberfell, vice president in charge of research. Representing Goodrich are Mr. Goodrich, John L. Collyer, president, and T. G. Graham, vice president in charge of production.

At the first meeting of the board of directors, Ross W. Thomas, general manager of Phillips' Philgas division, was elected president and general manager of the new concern. Dr. Waldo L. Semon, creator of Goodrich's two synthetics, Ameripol and Koroseal, was named vice president and director of research. Other officials elected were: treasurer, Herman Gangwer, a member of Goodrich's accounting department; secretary, Hy Byrd, assistant secretary of Phillips; assistant secretaries, W. F. Avery, assistant secretary of Goodrich, and B. F. Stradley, secretary of Phillips. The board further announced the appointment of Harry N. Stevens, former member of Goodrich's legal staff, as patent attorney; Frank M. Andrews, formerly of Philgas, as general sales manager; and W. D. Parrish, of raw materials control at Goodrich, as technical service engineer.

Koroseal Plant at Niagara Falls

Goodrich recently announced that construction has begun on a new plant at Niagara Falls, N. Y., where the manufacture of Koroseal is scheduled to start in the early fall. The Walter S. Johnson Construction Co., Niagara Falls, has been awarded the contract for the erection of the three-story steel and concrete building with 12,000 square feet of floor space.

Increased commitments for Koroseal, launched commercially in 1937, have necessitated the erection of this plant which will have a capacity of several tons a day. Niagara Falls was chosen because of the proximity of coke, limestone, and salt, raw materials needed in compounding this synthetic material.

Contrary to reports, the new plant for the present will not manufacture Ameripol, which for the time being, it was said, will be manufactured only at the company's main plant in Akron. The new plant is the first synthetic division of the company to be located outside of Akron.

Mansfield Tire & Rubber Co., Mansfield, has appointed as director of purchases James M. Slattery, formerly in charge of cotton and rubber purchases for the Fisk division, United States Rubber Co., Chicopee Falls, Mass. Mr. Slattery had spent more than 24 years with the Fisk organization.

NEW ENGLAND

Vultex Chemical Co., 666 Main St., Cambridge, Mass., through Sales Manager K. B. Osborn has announced that Charles E. Reynolds, formerly chief chemist and technical superintendent of the Cambridge Rubber Co., Cambridge, Mass., has joined the Vultex technical department, bringing with him a broad experience in proofing, saturating, coating, and doubling of fabrics with latex compounds. From 1925 to 1927, Mr. Reynolds was a chemist for the Kenyon Tire & Rubber Co. and from 1927 to 1929 was technical superintendent of the Vulcan Proofing Co., both of Brooklyn, N. Y. He joined Cambridge Rubber in 1929, first as technical superintendent of the proofing division and subsequently became chief chemist and technical superintendent of proofing and footwear operations.

Business in Rhode Island during July was at the highest July level in the past decade. Seasonable changes have been eliminated to a great extent. The rubber manufacturing industry shared in the general situation. The number of employes during July was 3,977 against 3,910 in July, 1939, and 4,115 in June, 1940. July, 1940, payrolls in the rubber industry totaled $305,000, against $320,000 in June and $278,000 in July, 1939. During July, 1940, the rubber industry used 1,902,000 kilowatt hours of electric power, against 2,277,000 in June and 2,062,000 in July, 1939.

United States Rubber Co., Providence, R. I., with employes, their families, numbering nearly 2,000, held their annual outing and field day on July 13 at Crescent Park on Narragansett Bay. A shore dinner was served at noon, followed by sports events, for which prizes were later awarded. In the evening there was dancing. Guests included M. George Burnett, factory manager; John M. Miller, assistant factory manager; Harry Brock, sales manager; William H. Cantwell, industrial engineer; Everett W. Howe, plant engineer, and W. Mac Howell, superintendent of the golf ball department.

Collyer Insulated Wire Co. employes from both the Pawtucket and Providence, R. I., plants held their annual outing at Crescent Park, on Narragansett Bay, August 11. Among the guests were General Manager Robert E. Moeller and Manufacturing Manager Walter H. Barney, of the company, and Business Agent Leon Matieu and Assistant Business Agent Walter Radican, of the labor union of the two plants. Featuring the sports program was a tug-of-war between employes of the two plants, won by Pawtucket. Before the sports events a shore dinner was served.

Ridgeway Realty Co. has purchased the former Elizabeth Mills and Consumers Brewing Co. property at Hillsgrove, R. I., from P. S. Van Kirk Co., of Paterson, N. J. The realty firm is the holding company for the American Insulated Wire Co., Providence, R. I., and the Leviton Mfg. Co., Brooklyn, N. Y., according to Ira S. Galkin, vice president and treasurer of the realty firm and president of American Insulated Wire. Mr. Galkin also stated that the Ridgeway company will lease space to the Leviton company to manufacture bakelite and allied products, and to the American Insulated Wire Co. to manufacture products in connection with its present expansion plans. Installation of machinery will begin immediately and when in operation, it is expected that the plants will employ between 300 and 400 workers.

MIDWEST

C. E. Miller Wills Company to Employes

Charles E. Miller, president of C. E. Miller Mfg. Corp., which manufactures tire retreading and recapping equipment, rubber worker's tools, repair materials, and camelback, and also does special rubber work, Anderson, Ind., who died on July 28, left the business to his emyloyes. The number of shares received depended upon the number of years ot continuous service with the concern. Thus about a thousand shares were distributed among 32 employes, ranging in lots from two shares to 125 shares, which went to Factory Manager Wm. V. Maze, who was with Mr. Miller more than 33 years. Many other workers have been with the firm from two to three decades.

Besides giving his manufacturing business, buildings, machinery, stocks, patent, good will, and everything connected with the business to his employes, Mr. Miller also left them an adjoining 14-apartment dwelling with six stores, all renting. His object in leaving this additional property to his workers was that they would have an income to help out in case of dull times.

According to Roy E. Kilgore, a nephew, who was named executor of the will, the Miller estate is valued at $400,000, personal property at $200,000, and real estate, the same amount. After special bequests the residue of the estate goes to several relatives. The widow was taken care of in a pre-nuptial agreement.

Following Mr. Miller's death Mr. Maze was elected president of the company; Mr. Kilgore, a vice president, was named treasurer also; and Sales Manager Glad S. King became secretary.

N. S. C. Congress

National Safety Council, Inc., 20 No. Wacker Dr., Chicago, Ill., will hold its twenty-ninth annual safety congress and exposition at the Stevens Hotel, Chicago, October 7 to 11. The program for the Rubber Section, scheduled for October 7 and 8, includes: Report of Activities by General Chairman R. W. Morse, of Firestone Tire & Rubber Co.; "Getting Safety off the Defensive," A. C. Horrocks, Goodyear Tire & Rubber Co.; Rubber Industry Equipment (30-Minute Talks); "Safety in Original Design," R. A. North, Farrel-Birmingham Co., Inc., and "Overcoming Existing Equipment Hazards," E. W. Beck, United States Rubber Co.; Discussion led by D. G. Welch, Hewitt Rubber Corp.; Luncheon (October 8), J. T. Kidney, of Goodyear, toastmaster, Entertainment, Election of Officers, Rubber Section Safety Contest of 1939-40; "Outstanding Facts," G. E. Teal, of U. S. Rubber, chairman of Rubber Section Statistics and Contest Committee, and Presentation of Awards by N. S. C. officer; "Placement of Accident Responsibility," Paul Van Cleef, Van Cleef Bros.; "Modernizing Safety Advertising," Lawrence H. Selz, Lawrence H. Selz Organization; Discussion led by Wm. H. MacKay, Dunlop Tire & Rubber Corp.; "Dermatitis in the Rubber Industry," Dr. W. E. Obetz, Industrial Commission of Ohio; Discussion led by Dr. J. Newton Shirley, Arrow Mutual Liability Insurance Co.

Monsanto Chemical Co., St. Louis, Mo., through President Edgar M. Queeny has announced the acquisition of 138 acres, the Bewick tract, located about 15 miles southwest of Detroit, Mich., a mile southwest of the business district of Trenton, and fronting on the Detroit River. The company has started plans for the erection of a plant, to go into operation in mid-1941, for the production of phosphoric acid and phosphates, including the various forms of disodium phosphate, trisodium phosphate, and tetrasodium pyrophosphate. The plant will be Monsanto's eighteenth and the fourth in the phosphate division of the company.

Monsanto has also bought all but two lots in two square blocks of property adjoining the west side of its St. Louis plant. The tenement buildings on the site will eventually be demolished, but as no plans have been made for immediate development of the property for manufacturing purpose, much of the space will be devoted to additional parking facilities for the company's employes.

Skelly Oil Co., Kansas City, Mo., recently announced several executive changes. J. D. Powell, assistant secretary and treasurer has been named a vice president *pro tem* of the company and is succeeded by Dow Williams as assistant secretary. No assistant treasurer, however, has been appointed as yet. Dr. A. Ernest MacGee, manager of the solvents division, has been transferred from the Chicago office to the general marketing office at Kansas City, where he will also be in charge of butane sales.

PACIFIC COAST

Marine Chemicals Co., South San Francisco, Calif., recently changed its name to Marine Magnesium Products Corp., in order better to express the nature of the company's business, which is confined exclusively to the production of technical and U.S.P. magnesium salts from sea water. These products include carbonates, hydroxides, and oxides, sold under the trade name "Marinco." During the past year the capacity of the plant has been practically doubled. Organized in 1927 by R. E. Clarke, who has been president and general manager since its inception, the company is said to be the first in the world to produce commercially any products directly from sea water except common salt. After two years of research and development, commerical operations were started in July, 1929. The main office of the concern and its plant and research laboratories are all located at the water's edge in South San Francisco.

U. S. Tire Dealers Corp., 1230 Sixth Ave., New York, N. Y., has appointed H. O. Bock, formerly Southern California divisional manager, divisional sales manager in charge of the entire Pacific Coast, covering territory including Los Angeles, Portland, Seattle, Spokane, and Salt Lake City branches. His headquarters are at Los Angeles. Mr. Bock, who joined the United States Rubber Co. in 1912 at Los Angeles, has also served as district manager at Kansas City, Mo., auto tire department manager at New York, and divisional field manager at Chicago and Detroit.

CANADA

Dominion Bureau of Statistics, Ottawa, last month announced that owing to the imperative necessity of preventing information reaching the enemy regarding the movement of strategic commodities publication of the Monthly Report of the Trade of Canada will be suspended as from the issue respecting the month of April, 1940. The publication will be resumed as soon as the exigencies of war permit.

The Dominion Bureau of Statistics reported that in June Canada's exports of rubber declined to $934,000 from $1,405,000 in June, 1939. Pneumatic tire casings shipped abroad were valued at $371,501; boots and shoes of rubber or part rubber, $344,545; inner tubes, $49,063; and rubber belting, $40,047. In June, Canada imported rubber valued at $982,000, against $1,210,000 in June, 1939. Raw rubber imports declined to 2,322,194 pounds from 5,427,942 in June, 1939. The United States sent 1,498,334 pounds, Ceylon 684,570 pounds, and the Straits Settlements 139,290 pounds.

Hon. C. D. Howe, Minister of Munitions & Supply, Ottawa, Ont., in his recent listings of contracts awarded includes the following: For mechanical transports, Goodyear Tire & Rubber Co. of Canada, Ltd., Toronto, Ont., $799,772; Dunlop Tire & Rubber Goods Co., Ltd., Toronto, $337,045; Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., $811,509; Sieberling Rubber Co. of Canada, Ltd., Toronto, $38,442; and Dominion Rubber Co., Ltd., Ottawa, $38,442. For clothing and accessories, Dominion Rubber, $62,367; Gutta Percha & Rubber Co., Ltd., Ottawa, $17,500; Rubberset Co., Ltd., Gravenhurst, Ont., $7,125; B. F. Goodrich Co. of Canada, Ltd., Kitchener, Ont., $25,500; Miner Rubber Co., Ltd., Granby, P. Q., $10,400. For barrack stores, Miner Rubber, $48,250; Dominion Rubber, $48,250.

Dominion Rubber Co., Ltd., Montreal, P. Q., has awarded a contract for construction of a two-story building and basement as an extension to its plant in Montreal, to cost about $40,000.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., has leased 30,000 square feet of floor space on the ground floor at 187 Geary Ave., Toronto. Pressure of business necessitated this additional space.

Trafalgar Rubber Co., Toronto, Ont. Papers in connection with an authorized assignment by the Trafalgar Rubber Co. have been filed at Osgoode Hall, Toronto, and F. Gordon Cook, official receiver in bankruptcy, has approved appointment of Canadian Credit Men's Trust Association as custodian. According to the papers filed under the signature of Samuel Levine, president, an endeavor was made at a meeting of the company and its creditors to make a compromise under the Companies' Creditors Arrangement Act, but this proposal was rejected by some creditors. The firm estimates secured creditors at $9,074.63 and ordinary creditors, $54,214.24. Assets are estimated as follows: bills receivable, $3,517; cash in bank, $819; machinery, $25,937; real estate, $15,280, and automobiles, $3,658.

McGill University, Montreal, P. Q., recently described a new type of rubber which acts as a conductor for electricity, developed through the cooperation of scientists and rubber technicians, which, it is claimed, will eliminate the danger of a spark igniting the gases of the anaesthesia. The danger comes with the build-up of static electricity in the anaesthesia equipment as the gas is flowing through conducting tubes. Now a rubber hose can be produced which actually conducts electricity. Thus, any static charge is led away to a suitable ground before it can build up sufficient potential power to develop a spark. This is only one of the projected uses for the new rubber. It is expected that it will have a widespread application in industry and distribution, particularly in the handling of gasoline.

OBITUARY

John S. Martin

A HEART attack caused the sudden death, on July 30, at his home in Naugatuck, Conn., of John Skyles Martin, 41, purchasing agent of the footwear plants of the United States Rubber Co., which he had joined at Williamsport, Pa., in 1920 immediately after graduating from Pennsylvania State College. He was transferred to Naugatuck in 1932.

Surviving are his mother, his wife, a son, and a brother.

Funeral services were held at the Congregational Church, Naugatuck, on August 1. Burial was in Woodstock Va., where he was born.

R. M. Littlejohn

AFTER a three-year illness Robert Malcolm Littlejohn, secretary and director of Littlejohn & Co., Inc., crude rubber importer, 52 Wall St., New York, N. Y., passed away on August 6 at his summer home in Southampton, L. I. Born in Flushing, L. I., on July 7, 1874, and educated at private schools, he later became associated with his father in the firm of James I. Townsend & Co., importer of products from the Far East. Subsequently the senior Mr. Littlejohn and his son formed a copartnership, L. Littlejohn & Co., later Littlejohn & Co., Inc.

The deceased belonged to the Society of Colonial Wars, the Metropolitan Club of New York, and several other organizations.

He leaves his wife, a daughter, her son and her daughter, and a brother.

Funeral services were conducted at his late residence in Southampton on August 8, with interment private.

Martin Szamatolski

AFTER a long illness Dr. Martin Szamatolski died at his farm in North Carolina on July 28. He was a former factory manager of Givaudan-Delawanna, Inc., 330 W. 42nd St., New York, N. Y., with which he had been associated from 1924 to 1938.

Born in Berlin, Germany, 71 years ago, he started his technical career as assistant professor at the University of Berlin, from which he had been graduated. In 1893 he migrated to the United States and worked for several paint and chemical concerns. In 1914, however, he was appointed chemical consultant to the State of New Jersey Department of Labor in the Bureau of Hygiene and Sanitation. The deceased has many achievements to his credit, including the origination of several pigments, processing changes providing maximum health protection in the white lead and dry color industry, the discovery of the cause of "radium sickness," and improved processes for the manufacture of aromatic chemicals.

Timothy J. Kelly

BACK in the World War a big, two-hundred-pound young man, standing over six feet, proved himself to be what has become fondly known as a good "fighting Irishman."

That man was Timothy J. Kelly.

He proved he could shoot straight then as he likewise proved to his many friends that he could shoot straight in every other phase of his living—his social, family, religious, and professional life. Such words, we realize, have been said about others, but upon none more truly deserving of them than Tim, as we affectionately called him.

Tim first came in contact with the Bill brothers about two decades ago. He officially joined our organization in 1927 and thereafter rose rapidly to the offices of secretary and comptroller which he filled so well for nearly ten years.

His sad passing on August 15, at the young age of 42, leaves us still too stunned to do justice to his useful and worthy life in this, our appreciation, not only of his faithful service, but of the man himself.

While those outside of the office, owing to the nature of his responsibilities, knew little of him, we wish our friends to know that we will miss his ability greatly. But we will miss his friendship more—for he had, in a large measure through sheer force of his lofty character, made himself the conscience of our business.

Men like him do not come into this world often, and when they are called to their reward, there remains a void that is never filled. In passing he leaves behind an inspiration to us, his friends of the Bill Brothers organization, for which we all offer our profound gratitude.

RAYMOND BILL
EDWARD LYMAN BILL

August 19, 1940

James W. Partington

JAMES W. PARTINGTON, vice president and treasurer of The Passaic Rubber Co., Inc., Clifton, N. J., died at his home there on July 28 after a heart attack. Born in West Brighton, Staten Island, March 18, 1867, he moved, when a boy, with his family to Lonsdale, R. I., where, in 1882, he started work on a bleachery. He continued in the same field even after going to Passaic, N. J., in 1890.

But in 1897 he joined The Okonite Co. and remained there until 1920, in charge of the tape department. Then in May, 1920, Mr. Partington, with Henry C. Mathey, a former manager at Okonite, formed The Passaic Rubber Co., Inc., manufacturing rubber tapes. Business increased and the firm was moved to Clifton, where a mechanical rubber department was added.

The deceased was a member of Unity Lodge, F. & A. M., Lonsdale, R. I., and in May, 1940, had been presented with a 50-Year Membership Medal.

Masonic funeral services were held the night of July 30. Burial took place July 31 at Ridgelawn Cemetery.

Survivors include his wife, a daughter, two sons, and a grandson.

FROM OUR COLUMNS

50 Years Ago — September, 1890

The advance of 10% on mechanical goods which took effect on June 2 last does not meet half way the rise in crude rubber, from 62¢ for fine Para, a year ago, to nearly $1, the current price. (p. 272)

There is a chance for some inventive genius to discover some process whereby gutta percha may be vulcanized, so that it can be used in covering wires for places other than under water. (p. 273)

One of the many substitutes for hard rubber is "Vulcanized Fibre," made of cotton paper pulp, chemically dissolved and compressed into sheets. (p. 282)

The St. George's Engineering Co., an English manufacturing concern, have lately turned out a new rapid safety bicycle which has a pneumatic rubber tire, somewhat larger and heavier than the ordinary tire and inflated with air by means of a small hand pump. There are only a few of these machines in the United States, one of which is owned in Rhode Island, one in Boston, and another in Baltimore. (p. 285)

The largest order of the kind ever placed in the West was that of the Armour elevator with the Chicago Rubber Works, for bucket, lag, and drive belts, amounting to over tw miles in length. The main belt was o rubber, 5 feet wide, 223 feet long, 8-ply, and weighed two tons. (p. 297)

25 Years Ago — September, 1915

American manufacturers who argue that having secured some of Europe's former trade they will be able to hold it permanently, war or peace, will be likely to discover that they have deceived themselves. (p. 639)

In 1909 Dr. Fritz Hofman and Dr. Carl Coutelle, chemists of the Elberfeld Dye Works, obtained absolutely pure isoprene and were the first to convert it into rubber by simply heating it in a closed tube separately or in the presence of certain other substances. (p. 646)

U. S. patent No. 1,149,577 consists of producing a caoutchouc substance by polymerizing isoprene or a butadiene hydrocarbon in a dilute aqueous solution of egg albumin, emulsifying the mixture during polymerization and finally separating the caoutchouc substance. (p. 648)

The introduction of rubber as a cushion into trolley and railway car wheel construction opens a field of interesting possibilities to the rubber manufacturers. (p. 654)

It is currently reported, through authentic sources, that the Ford Motor Co. is experimentally studying the subject of tire construction. Ultimately a tire plant with an annual capacity of 2,000,000 tires will be part of a new manufacturing center to be built by the Ford company. (p. 666)

Charles E. Miller

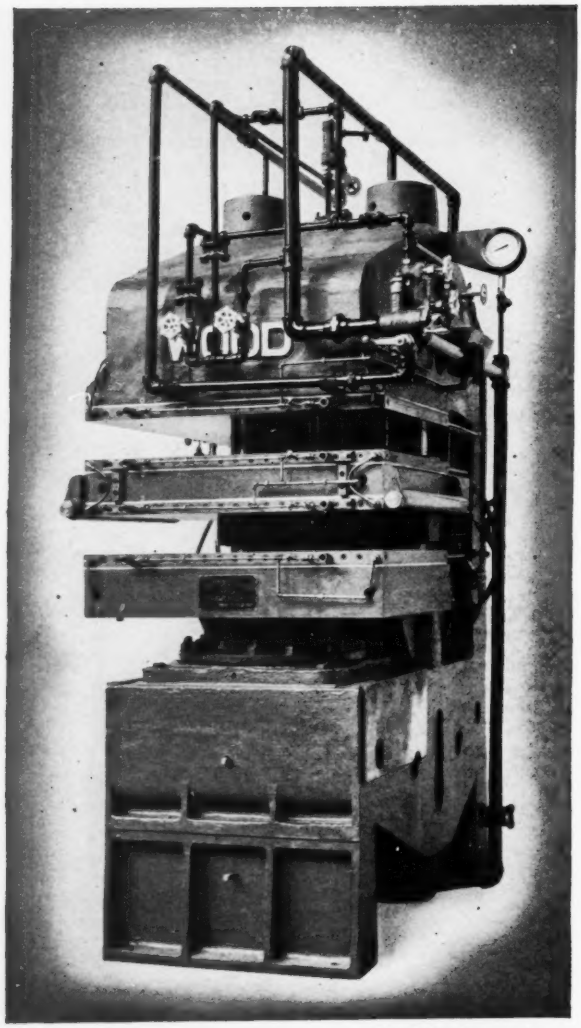
ON July 28, as a result of a heart attack following several months' illness, Charles E. Miller, of Anderson, Ind., died. He was president of the C. E. Miller Mfg. Corp., which made tire repair equipment, repair materials, and camelback and did rubber work.

The deceased was born near Lima, O., February 8, 1874, spent his boyhood on a farm, and attended a country school. Early in 1889 he went to work on a farm, but in the Spring of 1892, found employment in the Marion Bicycle Works, Marion, Ind. In 1894, on capital earned with after-hours private repair work with equipment he designed and made himself, Mr. Miller went to Anderson and started his own business selling and repairing bicycles and vulcanizing tires. Mr. Miller claimed to have designed, while at Marion, the first tire repair vulcanizer and to have done the first repairing job seven years before any other vulcanizer appeared on the market. During his lifetime he patented much tire equipment, including the first steam jacketed vulcanizer to vulcanize and repair automobile casings and inner tubes (1899), a sectional vulcanizer for repairing clincher tires (1902), and an adjustable vulcanizer for all sizes of tires (1911). From the start his business prospered and expanded from a little shop to a factory where everything needed in tire repairing was made and the business of supplying repair shops was developed. Besides tire repair outfits Mr. Miller also made vulcanizers for repairing and soling rubber footwear and at one time even manufactured tires. He conducted the business under his own name until 1930, when it was incorporated as Chas. E. Miller Corp.

In 1910 he instituted the policy of sharing profits with employes and was also well known for his personal direct contributions to needy persons. He played an important part in the business life of Anderson and owned considerable property there. Among the various organizations to which he had belonged were the Elks, Knights of Pythias, Masonic bodies, Y.M.C.A., Rotary Club, Chamber of Commerce, R. M. A., and F. O. O. E.

Married twice, Mr. Miller is survived by his second wife, a stepdaughter, a step-granddaughter, a brother, two sisters, and several nephews and nieces.

The funeral was on July 31. Burial was in West Maplewood Cemetery.



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Styroflex — New Electrical Insulation Material

The property that distinguishes polystyrol above all other organic insulating materials is that it shows no signs of aging when in a pure state. At temperatures over 200° C. it depolymerizes, and the higher its molecular weight, the more sensitive it is. Between 70 and 90° it begins to get soft and plastic and can then easily be formed by extrusion and casting. Among its outstanding properties are high resistance to moisture, which is unaffected by the type of polymerization. When placed directly in water, it absorbs at most 0.03% of moisture so that its excellent electrical properties are hardly affected by moisture. Dielectrical losses and dielectric constant are very low: the former has a value of tan $\delta = 1$ to 2.10^{-4}, and the latter amounts to about 2.5; surface resistance is 10^{16} ohm; the internal resistance, 10^{17} ohm·cm. These are values unsurpassed and hardly attained by even the best natural substances, as amber.

Hitherto, however, attempts at insulating cables by forcing a coat of polystyrol over wires, as is done with other thermoplastic insulating materials, have failed because of its brittleness, and the addition of softeners impairs its electrical properties.

But in Germany a way has been found to overcome the difficulty.[1] Starting from the fact that a spiral, even when made from a brittle material, has a certain flexibility in the direction of its axis, tests were made with spirals of polystyrol thread, when it was found that such threads were far more flexible than thought possible. Further investigation then showed that by using a purely mechanical process, polystyrol can be made to yield a very flexible material having all the original outstanding electrical and chemical properties as well as excellent mechanical characteristics. This material has been put on the market by the Norddeutsche Seekabelwerke, Nordenham, under the name Styroflex and is already largely used in cable making.

Producing Flexible Polystyrol

Essentially, the process used follows. Polystyrol, rendered plastic by heating under pressure of 50 to 100 at., was forced through a nozzle in the form of a thread which, as it issued hot and plastic, was drawn away under constant tension and at a greater speed than that at which it was extruded. From the moment the thread leaves the nozzle until it cools and hardens, the thread is thus stretched to a diameter smaller than it had originally. This process causes an alinement of the thread-shaped polystyrol molecules in the direction of tension.

The success of the stretching process depends on the diameter of the thread, for when this is above a certain limit, the unequal rate of cooling at the surface as compared with that at the core, precludes the desired effect. On the other hand, the smaller the diameter of the thread, the higher the degree of flexibility attainable.

After this initial success it was also attempted to make tapes and foils in the same way, but the products obtained were flexible only over their length and continued to be so brittle over their breadth as to render them useless for practical purposes. A modified process was then developed which is now in use. Polystyrol is extruded through an annular nozzle and immediately on issuing is drawn over a spreading device by which the tube is stretched in both directions and takes on a narrow rectangular shape. The borders are then cut off, leaving lengths of foil which are drawn off on to a reel.

Permanence of Stretching Effect

The acquired flexibility is retained by the Styroflex material at normal and at low temperatures down to that of liquid

air. But if the Styroflex is heated to above the softening temperature, the alinement of the molecules is lost by shrinkage, and the material becomes brittle again. Extensive tests were also made to determine whether Styroflex would in time also lose its flexibility at ordinary temperatures, when it was shown that at 20° C., for instance, the stretched condition is practically permanent.

The degree of stretch can be measured by means of double refraction, as polystyrol molecules are optically anisotropic.

An indication of the flexibility of Styroflex films is also offered by the results of continuous flexion tests.

Styroflex Silk and Fine Films

The latest development was the production of very fine thread having a diameter of about 1/100 mm., known as Styroflex silk. To exclude impurities of a size likely to weaken the thread, sets of filters are built in the extruder behind each nozzle, and the filter chambers are specially heated by electricity to prevent decrease in pressure. The nozzles are made of a platinum-palladium alloy.

Similar filters are also arranged in the heads of the presses for producing very thin Styroflex sheets. The thickness of sheets normally ranges from 0.02 to 0.15 mm. but for special purposes films of 0.01 mm. can be made.

As explained above, sheet is made by forcing the material through annular nozzles in the form of a tube which immediately passes on to a spreading device. Because the heat conducted by the metal edges of the spreader would prevent uniform cooling and stretching, the borders of the tube are cooled externally by a stream of compressed air which can be suitably adjusted.

Applications of Styroflex Products

Styroflex sheet is cut into bands on machines similar to those used in the paper industry. Styroflex bands and thread are used in the insulation of submarine and television cables and as dielectric in the construction of adjustable disk condensers and wound condensers for broadcast receiving apparatus. Styroflex silk is woven or braided around wires instead of cotton or silk; and though they do not resist creasing and crumpling so well as other similar materials, Styroflex films are being used for wrapping purposes.

Felten & Guilleaume Carlswerk uses Styroflex for high-frequency cables; the insulation about the central conducting wire consists of spirals built up of Styroflex thread over which are layers of Styroflex bands. A high-frequency cable put out by the Siemens firm has alternating layers of Styroflex combination cord, that is thread covered with thread, and Styroflex tape about the central wire.

In still another construction the insulation immediately under the lead sheath of the cable consists of a spiral built up of several layers of Styroflex tape. The Styroflex spiral protects the sheath and gives the cable great resistance to external pressure.

[1] "Production and Application of the Electrical Insulation Material Styroflex." H. Horn, *Kunststoffe*, Mar., 1940, pp. 53-57.

Lower Import Duties on Rubber and Latex

According to the American Embassy at Berlin, effective August 1 the German import duty on crude rubber, gutta percha, and balata has been reduced from 140 to 90 marks per kilo; the duties on latex underwent a similar reduction.

GREAT BRITAIN

Rubber in Wartime Goods

The hazards of modern warfare require new protective devices, and recently various new articles have appeared in which rubber plays an important part. First is the rubber boat or dinghy, as it is called here, which is proving valuable as a life saver and now seems to form part of the equipment of British bombers. A recently published story told how

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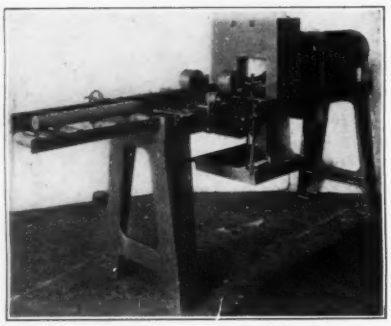

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the crew of a British bomber, returning from a raid in Germany, was forced to come down in the North Sea. The entire crew of six was able to get into the rubber dinghy in which they drifted for almost 13½ hours before they were picked up.

Then there is an Air-Raid Anti-Concussion Bandeau, marketed by Walter Webb & Baker, Ltd., London, and sold under the name of Webflex. This bandeau has been designed, after years of research, by a nerve specialist to protect the wearer against the harmful effects of the concussion caused by bombs or shells bursting nearby. The bandeau, made of Dunlopillo cushioning, covers the frontal region of the skull, the temples, and ear openings, and extends back to the base of the skull, protecting the underlying brain. This anti-concussion bandeau is made in four different sizes for men, women, and children, and while it is claimed that the wearer can definitely rely on protection from the effects of blast on the brain and on the ear-drum, it is made quite clear that the bandeau offers no resistance to splinters.

Also designed to be worn during air raids, are ear pads of soft aerated rubber, intended especially for A.R.P. wardens, members of the Local Defense Volunteers, and others who must be out during air raids. The pads are easy to put on and, while dispersing the blast from an explosion before it reaches the ear-drums, yet allows the wearer to hear ordinary conversation or the sound of a siren.

Rubber Imports and Exports

Crude rubber imports into the United Kingdom in May, 1940, had a value of £1,140,000, against £803,000 in May, 1939, and of £6,108,000 for the first five months of 1940, against £3,445,000 in the corresponding period of 1939. The value of exports of rubber goods continues to rise and in the period January-May, 1940, came to £1,123,000, against £629,000 in the first five months last year.

The Rubber Export Group

The organization of the Rubber Export Group is now complete and is similar to that set up by the Rubber Voluntary Control Panel.

The executive committee consists of: Sir Walrond Sinclair, chairman, Sir George Beharrell, acting chairman, Col. J. Sealy Clarke, T. J. Cragg, J. Cunningham, H. W. Franklin, J. L. Graham, F. R. Green, T. H. Hewlett, E. Jago, Alex. Johnston, L. V. Kenward, R. W. Lunn, C. T. Mabey, Reginald Moseley, M. Pooles, S. T. Rowe, and R. G. Soothill. W. F. V. Cox is secretary.

The chairman and secretaries of the sectional groups follow: Tire Section: chairman, Sir George Beharrell; secretary, Mr. Cox, who is also secretary of the mechanical ebonite, hose, flooring, surgical, belting, sole and heel and latex sections. Proofers Section: chairman, Mr. Cragg; secretary, C. E. Rogerson. Footwear Section: chairman, Mr. Johnston; secretary, Ivor W. Davis. Thread Section: secretary, D. P. G. Moseley. Golf, Tennis, and Squash Ball Section, and Sports Goods and Toy Section: chairman, P. W. Howard; secretary, A. Peake Jones. General Mechanical Goods Section: chairman, R. Moseley. Ebonite Section: chairman, T. H. Nicholls. Hose Section: chairman, W. White (wrapped hose), R. Woolf (all-rubber hose), P. W. Howard (molded hose). Flooring Section: chairman, Mr. Lunn. Surgical Goods Section: chairman, Mr. Franklin. Belting Section: chairman, A. W. Fletcher. Sole and Heel Section: chairman, R. Thorniley.

It has been made clear that the Board of Trade, acting through the Export Council, will not deal with individual firms, but only with the Rubber Export Group. It has further been stressed that Export Groups must plan aggressively and on fresh lines to maintain present markets and to find new ones.

At a meeting of the chairmen and secretaries of the various Export Groups, the president of the Board of Trade, Sir Andrew Duncan, stated that while the government would necessarily make additional demands on industry under present circumstances, those demands should be met by sac-

rificing the home market and not the export market. He further indicated that supplies of raw materials would go first to fulfill government requirements, and secondly the export market.

In a letter to Sir Walrond Sinclair, F. D'Arcy Cooper, expressed himself on similar lines. He stressed that before any question arose of choosing between one order and another, home trade should be neglected to make acceptance of *all* export orders possible. It could be left to the government to restrict exports in undesirable directions, or in undesirable quantities, he continued; and it should be confidently assumed by manufacturers that all export trade is nationally helpful so long as it remains unrestricted. Individual firms could learn on inquiry from their own Export Group in which directions the government would most appreciate a concentration of their selling efforts as individuals if it was not possible over the whole field. In developing export trade, Mr. D'Arcy Cooper went on to say, consideration must be given to markets where German goods are still able to compete effectively with British exports, for by ousting German exports, not only is foreign exchange earned, but Germany is at the same time deprived of an equivalent amount of foreign exchange.

At a meeting of the Incorporated Society of British Advertisers, Sir Cecil Weir, chairman of the Export Council, struck the same note: "At the present time we could make no greater mistake than to neglect the production of goods for export, which provides the funds for the purchase of armaments."

The propaganda for exports is apparently meeting with results, and as Sir Cecil put it, "In the last few weeks, British industry has become export-conscious to a degree never known before."

Since Italy has entered the war, attention is also being directed to the rubber business formerly in the hands of Italian rubber manufacturers. It seems that Manchester rubber firms, in particular, are preparing to capture this trade.

Other Export Groups Formed

A Pigment Color Makers' Export Group and a Rubber and Plastics Machinery Export Group, also recently formed, have been formally recognized by the Export Council of the Board of Trade. Chairman of the first group is H. Ralph, of Lewis Berger & Sons, and vice chairman, J. B. Dunn, of Champion, Druce & Co., Ltd. Mr. Dunn is chairman of the British Color Makers' Association.

The chairman of the Rubber and Plastics Machinery Export Group is R. T. Cooke, of Francis Shaw & Co., Ltd., and other members of the management committee at present are John Shaw, of John Shaw & Sons (Salford), Ltd., and H. Crabtree, of David Bridge & Co., Ltd.

RUMANIA

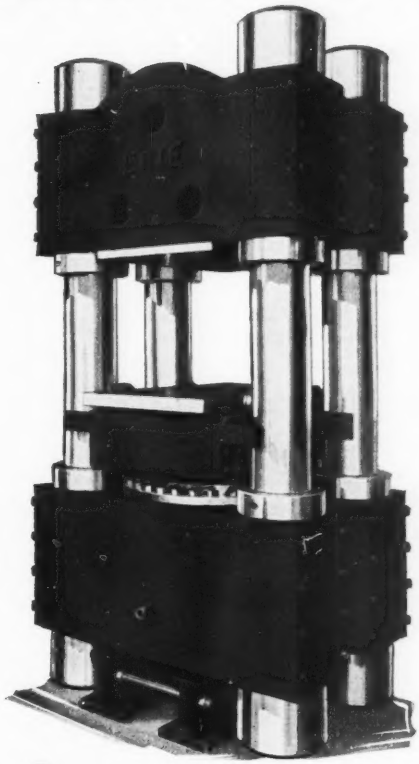
The Rumanian rubber and plastics industry, it is learned from German sources, includes 32 factories with 4,735 employes, an invested capital of 251,100,000 lei, and annual output valued at 730,600,000 lei. The government greatly encourages the rubber industry, especially the production of tires.

At present automobile and airplane tires are produced by the important Banloc concern, formed in 1937 with a capital of 150,000,000 lei, and also by the Gummifabrik A.G., Kronstadt. It is also reported that about a year ago, the Ministry for National Defense acquired a license from a firm in Amsterdam, Holland, to manufacture tires, but further details about this transaction have not since been published.

The most important branch of the rubber industry here is probably that of rubber footwear. The biggest producer is the Caurom A.G., with an annual output of about 500,000 pairs of rubber galoshes and overshoes. The next largest footwear manufacturer is the Cauciucul-Quadrat A.G.

Imports of rubber and rubber goods had a value of 289,-

MODERN PRESSES



for PLASTIC PRODUCTS

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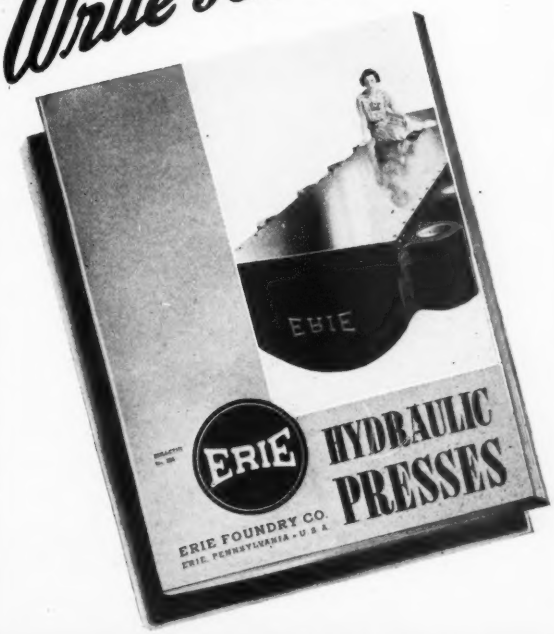

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000,000 lei in 1939. There is no export trade. The figures for the individual imports last year show interesting changes compared with 1938. Thus purchases of crude rubber, which had mounted from 786 tons in 1935 to 2,066 tons in 1938, declined to 1,288 tons in 1939 as a result of the British blockade. Increased home production of footwear caused a drop in imports of these goods from 220 tons, value 40,600,000 lei, in 1938 to 116 tons, value 23,000,000 lei, in 1939. But despite higher local outputs, the widespread motorization and military requirements sent the demand for foreign tires up from 847.5 tons, value 84,300,000 lei, to 942.8 tons, value 104,800,000 lei. Germany and the protectorate supplied the greater part of the 1939 imports of footwear, but Great Britain led as a source of tires, with Germany a poor second. Other imports were surgical goods, 23 against 37 tons; technical rubber, 18 against 19 tons; hard rubber goods, 66.9 against 60 tons.

ITALY

Italy's plans to free itself from rubber imports are apparently progressing rapidly. A third company is planning to produce synthetic rubber. This is the Societa Anonima Industria Gomma Sintetica, reported to be working with the Societa Italiana per la Produzione della Gomma Sintetica and the Instituto per lo Studio della Gomma Sintetica, and it will operate two large plants. The first, to start working in 1941, is to be a purely Italian undertaking, using processes, machinery, trained personnel, and raw materials, only of Italian origin. The second and larger plant will use German processes of the I. G. Farbenindustrie A.G. It is to be situated in the Gualdo Cattaneo zone in Umbria which has undeveloped lignite resources. Electric energy and calcium carbide will be supplied by the Terni concern.

FAR EAST

JAPAN

Synthetic Rubber Development Static

Despite constant reports about the development and exploitation of synthetic rubber processes, Japan does not seem to have as yet made any real advance in these directions. Output of synthetic rubber is officially stated to have been 100 metric tons in 1938; no figures for 1939 have been issued.

About one year ago it was reported in the press that a new scheme was to be adopted by the Department of Commerce and Industry by which the synthetic rubber industry was to be firmly established in the next ten years. Starting 1940, there would be five years of experimental work on synthetic rubber, followed by five years of intermediate experimental work, the aim being to replace about one-third of domestic natural rubber consumption by Japanese synthetic rubber. Japan's consumption of natural rubber averages about 60,000 tons a year so that the goal for synthetic rubber is 20,000 metric tons a year.

In March, 1940, a local paper reported that a bill to expand the synthetic chemical industry, about to be submitted to the Imperial Diet, also included provisions to promote the synthetic rubber industry.

Meanwhile the newspaper *Nichi Nichi* reports that the Manchuria Chemical & Industrial Co. is negotiating with German patent holders for the right to manufacture Buna. If negotiations succeed, Buna factories, equipped with German machinery, will be established in Manchukuo. It may be recalled

that about two years ago Netherland sources reported that the Nippon Denko Kaisha had obtained a license from the I. G. Farbenindustrie to manufacture rubber according to the German processes.

Another report, circulated about a year ago, announced that the Honen Oil Mfg. Co., had succeeded after five years of investigation in producing a rubber substitute from soya beans. This rubber substitute was claimed to be as elastic, if not more so, than reclaimed rubber and to cost about one-half as much as crude.

Crude Rubber Difficulties

Japan restricts imports of crude rubber and fixes the selling prices; consequently the Japan Rubber Importers' Association has experienced grave difficulties in the distribution of crude rubber, especially following the outbreak of the war and the devaluation of the yen. For the cost price of rubber was higher than the selling price fixed by government. A wave of arrests followed for illegal transactions in crude rubber, and the Association for a time suspended operations, before the government finally decided to relieve the situation by raising the official price of crude rubber.

For the three years 1935, 1936, and 1937, Japan's annual imports of crude rubber averaged 61,500 metric tons, but government restrictions reduced the amount to 47,062 metric tons in 1938 and to 43,032 tons in 1939.

High Scrap Rubber Imports

Apparently reduced crude rubber imports have been made up by larger scrap rubber imports. Thus purchases of scrap have soared from 1,413,800 kin, value 126,134 yen, in 1935 to 8,171,200 kin, value 895,848 yen, in 1938, and to 37,397,200 kin, value 3,542,691 yen, in 1939. (100 kin equal 132.2772 pounds.) Most of the scrap rubber as usual came from the United States.

The various government regulations fixing prices and restricting distribution and consumption not only of crude rubber but also of scrap, reclaimed and powdered rubber, in combination with shortages in electric power, coal, labor, and chemicals, have hit the thousands of small rubber manufacturers especially hard, and many have been forced out of business. Other small, as well as medium-size firms, have tended to amalgamate so as to get better treatment in the allotment of raw materials.

Exports of Rubber Goods

While the outbreak of the war has caused difficulties in regard to imports of raw materials, it is reported to have stimulated the Japanese rubber goods industry, and the outlook is considered promising.

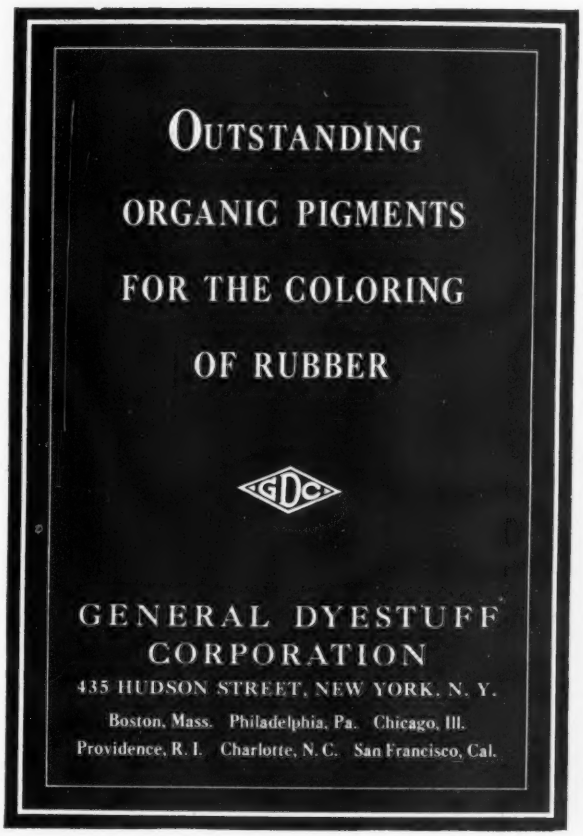
Exports of rubber goods fluctuated considerably in the five years 1935 to 1939. In 1935 the total value of exports was 41,815,972 yen; in 1936, 40,523,839 yen; in 1937, 52,512,851 yen; in 1938, 34,334,258 yen; and in 1939, 38,020,722 yen.

NETHERLAND INDIA

Shipments of crude rubber from Netherland India in May and June, 1940, follow (in long tons):

	Estate Rubber	Native Rubber	Total
1940			
May	19,743	20,567	40,310
June	25,236	19,508	44,744

During the first half of 1940, Netherland India shipped 257,280 tons of rubber against permissible exports of 256,000 tons. As 1939 had ended with under-shipment of 969, there is an excess of exports over permissible amounting to 311 tons. Native shipments are responsible for this excess, for whereas estates shipped 8,696 tons less than was permitted during the half year, natives sent out 9,976 tons more than the permissible amount.



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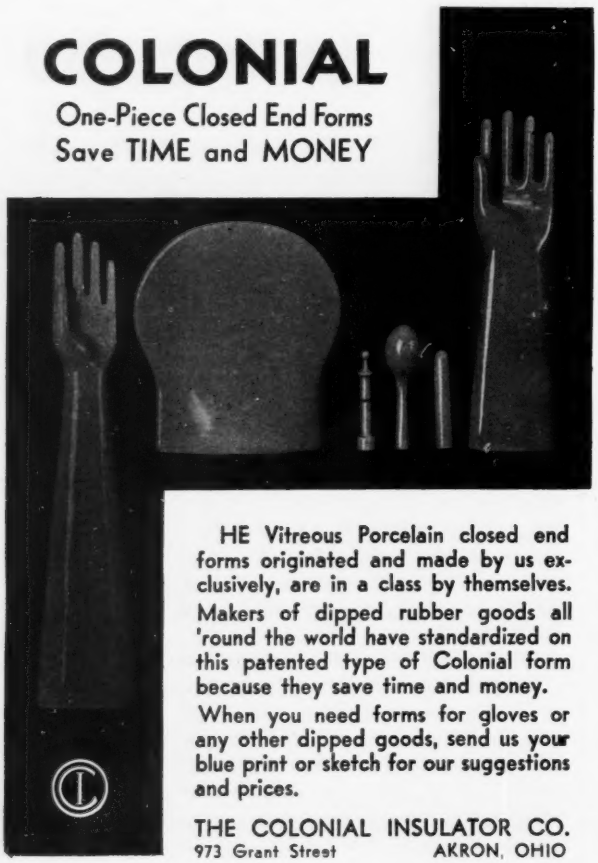

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Editor's Book Table

BOOK REVIEWS

"Textile Testing. Physical, Chemical and Miscroscopical." John H. Skinkle. Published by Chemical Publishing Co., Inc., 148 Lafayette St., New York, N. Y. 1940. Cloth, 5½ by 8 inches, 284 pages. Indexed. Price $3.

This book, suitable as a text or reference work, gives several methods for any particular textile text, including rapid and convenient approximations. At the end of each test is a bibliography of references for further information. The book has 17 chapters and is divided into three parts: physical, chemical, and microscopical testing. Tables, illustrations, graphs, and sketches supplement the text.

"Wage and Hour Manual. 1940 Edition." Published by The Bureau of National Affairs, Inc., Washington, D. C. 1940. Cloth, 6 by 9 inches, 648 pages. Indexed. Price $4.50.

This volume cumulates in one place all material on the regulation of wages and hours, both federal and state. It is intended as an authoritative guide to both employers and employes in answering questions on the Fair Labor Standards Act, Public Contracts Act, Eight-Hour Law, Anti-Kickback Act, or the wage laws of any state.

"Handbook of Mathematical Tables and Formulas." Second Edition. Compiled by R. S. Burington. Published by Handbook Publishers, Inc., Sandusky, O. 1940. Cloth, 5¼ by 7¾ inches, 282 pages. Price $1.25.

The general arrangement of the first edition, which appeared in 1933, has been retained in the second edition of this handbook. In the first part of the book a summary of the more important formulas and theorems of algebra, trigonometry, analytic geometry, calculus, and vector analysis is given. A comprehensive table of derivatives and integrals is included. The second part contains logarithmic and trigonometric tables to five places; tables of natural logarithms, exponential and hyperbolic functions, squares, cubes, and many other numerical quantities.

"Vibration of Rail and Road Vehicles." B. S. Cain. Published by Pitman Publishing Corp., 2 W. 45th St., New York, N. Y. 1940. Cloth, 5⅝ by 8⅜ inches, 264 pages. Index. Price $5.

Two groups are concerned with the problems of the vibration of vehicles—vehicle engineers and vibration specialists. This book was written with the hope that it may help these two groups to appreciate each other's problems and points of view. Increased operating speeds and better riding qualities are modern trends in transportation that have called for greater attention to vibration problems.

The book is divided into four parts: vibration theory, automobiles, street cars, railroad vehicles. There is a chapter on rubber springs, which, because of the scope of the book, is necessarily brief. Formulae, which are only rough approximations, and diagrams cover rubber sandwiches in compression and in shear, circular sandwich in torsion, and concentric tube spring. Elsewhere in the book, as for example in the chapters on engine mountings and on street car vibrations, the application of rubber is mentioned.

NEW PUBLICATIONS

"Cambridge Thermionic pH Recorder." Cambridge Instrument Co., Inc., 3732 Grand Central Terminal, New York, N. Y. 4 pages. The thermionic continuous pH recorder described in this bulletin utilizes a glass electrode assembly and a combined thermionic potentiometer-recorder. The thermionic potentiometer provides all-electric operation from a 110-125 volt a.c. source.

"Cabot Carbon Black. Industrial Highlights." Godfrey L. Cabot, Inc., 77 Franklin St., Boston, Mass. 16 pages. This is the first of a series of graphical and pictorial presentations based on the manufacture of carbon black and its relation to the fields of rubber, paint, lacquer, ink, and paper manufacture. Photos in this issue show: carbon black manufacture and quality control; spatial models of carbon black and graphite atoms; rubber and ink manufacture; the eight Cabot plants; cleanliness facilities for carbon black workers; and a typical company camp in Texas.

"A Handbook of White Pigments." Third Edition. Krebs Pigment & Color Corp., Wilmington, Del. 44 pages. This handbook summarizes the properties and uses of the firm's three classes of white pigments: pure titanium dioxide, extended titanium pigments, and lithopones. Two pure titanium dioxide pigments and two titanium calcium pigments are referred to specifically for use with rubber.

"Hewitt Magazine." Summer, 1940. Hewitt Rubber Corp., Buffalo, N. Y. 16 pages. The summer issue of this quarterly pictures several unusual and interesting installations of the firm's products—conveyer belting for seeds and livestock feed, transmission belting for saw mills, rotary drilling hose for oil-well operations, etc.

"Processing Equipment. The Day Ro-Ball Gyrating Screens." Bulletin No. 376. The J. H. Day Co., Cincinnati, O. 4 pages. Construction details embodied in Ro-Ball gyrating screens are individually illustrated and described in this folder which also contains specification of screen units for two to five separations.

"Stamford Factice Introducing Amberex Type B." The Stamford Rubber Supply Co., Stamford, Conn. 8 pages. This small booklet discusses factice and in particular the new Amberex Type B, recently introduced by the firm. Formulas with physical test data, properties, and a discussion of compounding and packaging are presented. Two rubber samples compounded with the new factice are attached.

"Goodrich Mechanical Rubber Goods." The B. F. Goodrich Co., Akron, O. 24 pages. This condensed catalog covers a wide range of the firm's mechanical rubber goods: belting and hose of many types, packing, mats, rubber-lined tanks and barrels, rubber cements and putty, valve disks, Vibro-insulators; expansion joint filler, and many other items.

"Plasticizers and Resins." Monsanto Chemical Co., St. Louis, Mo. 40 pages. The essential characteristics of certain Monsanto plasticizers and resins are set forth in this informative booklet. For each type of plastic, suggestions for plasticization are given. Also discussed is the use of the Arochlors (chlorinated diphenyls) with rubber, synthetic rubber, and chlorinated rubber.

"The Particle Size and Shape of Colloidal Carbon as Revealed by the Electron Microscope." Columbian Carbon Co., 41 E. 42nd St., New York, N. Y. This booklet, issued as Volume II of "Columbian Colloidal Carbons," is the first of a series of studies in which previous work on the size and shape of colloidal carbon particles is reviewed and the initial results of an electron microscope investigation of Micronex carbon black are presented and analyzed. From the results it has been concluded that: the particle diameter of Micronex colloidal carbon black, originally estimated to be 80 mμ, later as 50-60 mμ, now appears to require further downward revision to about 30 mμ; the estimate of specific surface would now appear to require upward revision to about 5,000,000 square inches per cubic inch; the preponderating geometrical form of the ultimate particles is spheroidal with some evidence of plane surfaces; the establishment of a much lower particle size suggests the possibility of more efficient employment of the total available carbon surface in reenforcement phenomena. A bibliography of 103 literature references is included, as well as electron photomicrographs of colloidal carbon.

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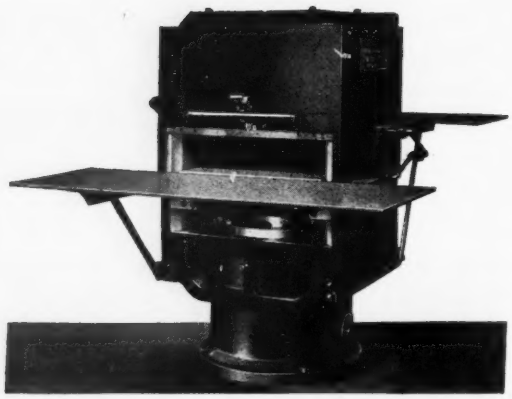

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"Annual Survey of American Rubber Chemistry for 1937." Webster N. Jones, Published as Engineering Bulletin 86 of the Carnegie Institute of Technology, Pittsburgh, Pa. 64 pages. Price 75¢. The last previous edition of this review, which covered the year 1936, appeared in 1937. The publication this year of the survey for 1937, although late, will be welcomed by all those following the advances in rubber chemistry and technology. The present survey is based on 326 American patent and periodical references, with the subject matter divided into the following classifications: crude rubber, properties and structure of rubber, accelerators, retarders of vulcanization, plasticizers, age resisters, compounding ingredients and compounding, control and testing, reclaiming latex and rubber dispersions, cements and adhesives, rubber technology, synthetic rubber and rubber-like products, derivatives of rubber, and miscellaneous. The continuation of this annual survey should be urged, particularly as it may be used to serve as a supplement to the Division of Rubber Chemistry's A. C. S. monograph, "Chemistry and Technology of Rubber," which appeared in 1937 under the editorship of C. C. Davis and J. T. Blake.

"Selected Latin American Export Commodities." Part III of a report on "The Foreign Trade of Latin America. United States Tariff Commission, Washington, D. C. Part III of this report contains a series of digests of information on 30 important Latin American commodities, covering: relative position of Latin America in world production; exports from Latin America; trade barriers, competitive conditions, and prices; and the effects of the European war.

"Metco News." Metallizing Engineering Co., Inc., manufacturer of Metco Metallizing Equipment, 21-07 41st Ave., Long Island City, N. Y. This is the first issue of a new periodical devoted entirely to the latest developments and applications of the metal spraying process. Published primarily for all those actively engaged in the maintenance, salvaging, or manufacture of metal products or equipment, it may be secured gratis by writing the metallizing company.

"Research . . . to search for facts and principles with care and diligence." The Okonite Co., Passaic, N. J. 32 pages. By means of numerous photographs and brief text, this booklet takes the reader through the firm's new research laboratory, following step-by-step the development of a new insulation. The numerous test methods and the amount of work involved emphasize the extensive nature of insulated wire and cable research.

"Belmont Packings." The Belmont Packing & Rubber Co., Butler and Sepviva Sts., Philadelphia, Pa. 84 pages. Photographs, engineering data, and concise information on distinctive features, construction, and application are used to describe each packing covered by this catalog. Among the products are those which utilize rubber in conjunction with asbestos, duck, flax, and fabric sheeting. Neoprene goods are also included.

"Synthetic Rubbers. A Review of Their Compositions, Properties, and Uses." Circular C427. Lawrence A. Wood. National Bureau of Standards, Washington, D. C. For sale by the Superintendent of Documents, Washington, 10¢. 32 pages. This circular,[1] covering published work on 26 commercial varieties of synthetic rubbers during the past ten years, furnishes a comprehensive summary and a complete bibliography of literature on this subject for the period under review. The various synthetic rubbers are classified as: (1) chloroprene polymers, (2) butadiene polymers (including copolymers), (3) organic polysulphides, (4) isobutene polymers, (5) plasticized vinyl chloride polymers, and (6) dimethylbutadiene polymers. The discussion covers: reactions and materials involved in manufacture; important physical properties; superiority of synthetic rubbers to natural rubber; applications; and production figures and prices. The extensive bibliography contains 232 literature references.

[1] This survey appeared in our July 1, 1940, issue, pp. 33-43, 51.

"Parade of Plastics." E. I. du Pont de Nemours & Co., Inc., Plastics Department, Arlington, N. J. 8 pages. Many of the highlights in the story of plastics are brought out here, together with descriptions of their characteristics and some of their uses. Emphasis is placed on Du Pont's recent progress in this field.

"Gilmer V-Belt Drives." L. H. Gilmer Co., Tacony, Philadelphia, Pa. 96 pages. This guide to V-belt practice contains a wealth of information on the subject,together with photographs, diagrams, and charts. Multiple and fractional horsepower V-belts are both included as is a complete section on sheave information.

"Shipping Departments Save Time and Money with Hallmark Burlap Tubing." Stein, Hall & Co., Inc., 285 Madison Ave., New York, N. Y. The burlap tubing described in this folder is spirally sewed in continuous lengths from standard widths of cloth. This packaging material is said to be used successfully for rubber hose and belting and other products shipped in rolls.

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Importance of Rubber to the New World. E. G. Holt, *Bull. Pan. American Union*, July, 1940, pp. 492-500.

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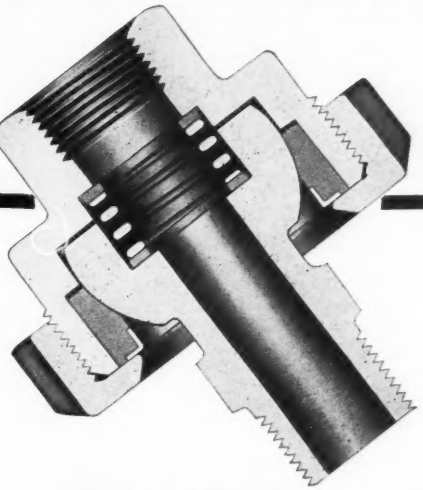

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2,206,329. **Machine to Grind and Make Ready Rubber Printing Plates.** K. Kruger and L. Koop, assignors to Fischer & Krecke G.m.b.H., all of Bielefeld, Germany.

2,206,494. **Thread Covering Apparatus.** S. W. Alderfer, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,207,405. **Extrusion Apparatus and Process.** E. Jacobson, San Francisco, Calif.

2,208,324. **Circular-Type Apparatus to Build Tires** Utilizing a Plurality of Tire Building Forms Movable to Successive Operating Stations. J. I. Haase, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,208,536. **Rubber Plate Vulcanizer.** R. W. Brown, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,208,693. **Material Perforator.** G. L. Alward, Lynwood, and C. T. Lear, Los Angeles, both in Calif., assignors to B. F. Goodrich Co., New York, N. Y.

2,208,767. **Apparatus and Method of Making Tires.** D. A. Macdonald and C. M. O'Donohoe, both of Indianapolis, Ind., assignors, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,208,830. **Valve** for Hydraulic Systems. F. J. Tarris and D. Webb, assignors to India Rubber, Gutta Percha & Telegraph Works Co., Ltd., all of London, England.

2,208,868. **Method and Apparatus for Reenforcing Inner Tubes** by Introducing a Sealing Substance within Tube. H. T. Kraft, assignor to General Tire & Rubber Co., Akron, O.

2,208,963. **Device to Wind Insulating Material on Cables.** E. M. Diehl, Bath, Pa.

2,209,713. **Arm for Handling Drop Center Tires** on Weaver Tire Machines. R. Campbell and J. J. Matthews, both of Taft, Calif.; Matthews assignor to Campbell.

Dominion of Canada

389,672. **Strip Material Vulcanizer.** J. M. Bierer, Waban, Mass., U. S. A.

389,729. **Rubber Strip Manufacturing Apparatus.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of C. J. Randall, Naugatuck, Conn.

389,880. **Tire Mold and Method of Making It.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of A. W. Bull, Grosse Pointe, Mich.

389,929. **Tire Mold.** Wingfoot Corp., Wilmington, Del., assignee of C. H. Zimmerman, Akron, O., both in the U. S. A.

390,338. **Tire Slitter.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of G. F. Wikle, Ann Arbor, Mich., U. S. A.

390,526. **Apparatus to Make Flanged Pouch-Like Rubber Articles.** I. B. Kleinert Rubber Co., assignee of R. H. Guinzburg, both of New York, N. Y., U. S. A.

United Kingdom

518,957. **Vulcanizers,** Particularly for Molding Tires. D. Bridge & Co., Ltd.

518,973. **Presses** for Making Hot Vulcanized-Rubber Articles. Bata Ackciova Spolecnost.

519,036. **Hydraulic Presses.** G. J. Broughton.

519,154. **Cord Stretcher and Winder.** United States Rubber Co.

519,873. **Vehicle Tires and Method and Apparatus for Retreading Them.** J. C. Heintz.

519,944. **Electrically Heated Vulcanizers** to Repair Tires and for Other Purposes. R. Dupont.

520,766. **Apparatus to Coat Wires, Cables, Textile Threads and Strips, Etc.** Rotalac, Ltd., and W. O. Larmuth.

520,804. **Tire Slitters.** United States Rubber Products, Inc.

521,494. **Machines for Producing Rubber Sheet from Coagulated Latex.** Shaw, Darby, & Co., Ltd. (Hutterbachs, Ltd.).

521,581. **Apparatus and Methods for Tensioning and Winding Resilient Thread.** Consolidated Rubber Manufacturers, Ltd.

521,897. **Molding Presses.** J. A. Muller and W. R. Tucker.

521,955. **Apparatus and Method of Making Pneumatic Tire Covers.** Dunlop Rubber Co., Ltd., and J. W. M. Hill.

PROCESS

United States

2,206,438. **Inflatable Toric Article.** W. H. Trexler, Ravenna, O.

2,206,441. **Method of Making Laminated Products,** Which Comprises Superimposing a Layer of Curable Rubber Compound upon a Layer of Curable Rubber Hydrohalide Compound and then Vulcanizing under Pressure. H. A. Winkelmann and E. W. Moffett, both of Chicago, Ill., assignors to Marbon Corp., a corporation of Del.

2,206,714. **Electrical Wire Attachment Caps.** G. B. Benander, Yalesville, assignor to Monowatt Electric Corp., Bridgeport, Conn.

2,206,757. **Spongy and Cellular Products** from Rubber and Rubber-like Materials. J. A. Talalay, Bedford, England.

2,206,808. **Tubular Elastic Fabric.** R. E. Davis, assignor to W. B. Davis & Son, Inc., both of Fort Payne, Ala.

2,206,908. **Electroplating Molds** for Rubber Articles. R. L. Lunt, Cuyahoga Falls, O.

2,206,971. **Golf Balls.** E. Myers, Waltham, Mass.

2,207,098. **Making Tire Tread** by Forming Cuts in Head and Filling Cuts with More Flexible Rubber Compound before Vulcanization. C. E. Maynard, Northampton, Mass., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,207,100. **Making Tire Tread** by Forming Cuts in Tread and Filling Cuts with Anti-Adhesion Medium before Vulcanization. C. E. Maynard, Northampton, Mass., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,207,110. **Cut Rubber Thread.** D. Rhee, assignor to Carr Mfg. Corp., both of Bristol, R. I.

2,207,279. **Cord Fabric.** (Latex.) S. W. Alderfer, Fairlawn, assignor to Firestone Tire & Rubber Co., Akron, both in O.

2,207,815. **Manufacture of a Plurality of Similarly Shaped Rubber Articles** by Depositing Successive Separable Films on a Deposition Surface. S. R. Ogilby, Staten Island, assignor, by mesne assignments, to United States Rubber Co., New York, both in N. Y.

2,209,509. **Cut Rubber Thread.** A. H. Carr, assignor to Carr Mfg. Co., both of Bristol, R. I.

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390,168. **Rubber Cement.** Patent & Licensing Corp., New York, N. Y., assignee of E. O. Groskopf, Rutherford, N. J., both in the U. S. A.

390,507. **Meteorological Balloons.** Dewey & Almy Chemical Co. of Canada, Ltd., Ville La Salle, P. Q., assignee of W. C. Ross, Winchester, and A. P. Rehbock, Cambridge, co-inventors, both in Mass., U. S. A.

390,520. **Multiple Passage Hose.** Hewitt Rubber Corp., assignee of M. Berman and W. Brockner, co-inventors, all of Buffalo, N.Y., U. S. A.

United Kingdom

518,483. **Adhesive Tape.** N., P., and F. Van Cleef.

519,918. **Gaskets, Etc.** Behr-Manning Corp.

520,057. **Marking Rubber Covered Electrical Conductors.** Callender's Cable & Construction Co., Ltd., J. Bowyer, and J. Taylor.

520,428. **Fireproof Rubber.** Dunlop Rubber Co., Ltd., D. F. Twiss, I. Kemp, and F. W. Warren.

521,723. **Laminated Elastic Fabrics.** International Latex Processes, Ltd.

522,057. **Bonding Rubber to Metal.** United States Rubber Products, Inc.

522,183. **Reclaiming Rubber.** United States Rubber Co.

CHEMICAL

United States

2,206,022. **Co-Polymerization of Vinylidene Chloride and a Vinyl Ester.** E. C. Britton and C. W. Davis, assignors to Dow Chemical Co., all of Midland, Mich.

2,206,433. **Antioxidant**—Secondary Aryl Decahydronaphthylamine. W. L. Semon, Silver Lake Village, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,206,434. **Thermoplastic Composition**—Mixture of Rubber and Resin Dissolved in Fused Rosin. H. Shrager and B. Shinberg, both of Lawrence, assignors to Atlas Shoe Products Corp., Lowell, all in Mass.

2,206,448. **Softened Rubber** Obtained by Treating Latex with a Hydrazine in the Presence of a Neutral Peroxygen Compound. W. F. Busse, Akron, and E. N. Cunningham, Cuyahoga Falls, both in O., assignors to B. F. Goodrich Co., New York, N. Y.

2,206,454. **Antioxidant** — Open-Chain. Aromatic Amine with at Least Three Diarylamine Radicals Joined by Alkylidene Radicals. D. Craig, Silver Lake, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,206,641. **Methylene Polysulphide Plastic.** (Synthetic.) J. C. Patrick, Kansas City, Mo.

2,206,642. **Heat Curable Composition** Comprising a Tetramethyl Thiuram Sulphide Incorporated with an Organic Polysulphide. (Synthetic.) J. C. Patrick, Trenton, assignor to Thiokol Corp., Yardville, both in N. J.

2,206,643. **Organic Polysulphide Cement.** (Synthetic.) J. C. Patrick, Morrisville, Pa., assignor to Thiokol Corp., Yardville, N. J.

2,206,780. **Leak Resistor.** W. C. Linton, assignor to Fuse Indicator Corp., both of Washington, D. C.

2,207,608. **Separation of Butylene-1 and Iso-Butylene from Mixtures Containing Them.** (Synthetic.) E. C. Britton, H. S. Mutting, and L. H. Horsley, assignors to Dow Chemical Co., all of Midland, Mich.

2,207,760. **Preparation of Butadiene** by Passing a Dichlorinated Normal Butane into a bath of Molten Metal Chlorides. (Synthetic.) C. R. Russell, assignor to Dow Chemical Co., both of Midland, Mich.

2,207,784. **Making 2-Chloro-1, 3-Butadiene by Reacting Monovinylacetylene with Hydrogen Chloride.** (Synthetic.) A. S. Carter, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,207,901. **Removing Dissolved Copper from Chloroprene** by Treatment with Metal above Copper in Electromotive Series. (Synthetic.) N. C. Somers, Carneys Pt., and L. S. Danser, Salem, both in N. J., assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,208,326. **Accelerator**—Primary Amino Hydroxy Propane. J. G. Lichty, Stow, O., assignor to Wingtoot Corp., Wilmington, Del.

2,208,327. **Accelerator**—Addition Product of a Saturated Primary Amine and a Zinc Salt of a Dialkyl Dithiocarbamic Acid. J. G. Lichty, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.

2,208,328. **Nitriles of Acrylic Acids** from Cyanoalkyl Esters or Cyanoalkyl Carbinols. (Synthetic.) J. G. Lichty, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.

2,208,333. **Accelerator** — Aryl Selenazyl 2-Sulphide Compound. W. Scott, Akron, O., assignor to Wingtoot Corp., Wilmington, Del.

2,208,441. **Rubber Hydrochloride** from Scrap Rubber Containing More than 2% Zinc Oxide. H. A. Winkelmann, assignor to Marbon Corp., both of Chicago, Ill.

2,208,442. **Purifying Rubber Hydrochloride** Containing Iron. H. A. Winkelmann, assignor to Marbon Corp., both of Chicago, Ill.

2,208,616. **Reactivation of Spent Hydrogenation Catalysts.** V. E. Wellman and W. L. Semon, both of Silver Lake, O., assignors to B. F. Goodrich Co., New York, N. Y.

2,209,215. **Producing Butadiene** by Dehydrogenating Normal Butane. (Synthetic.) P. J. Wiezevich and R. Rosen, both of Elizabeth, N. J., said Wiezevich now by judicial change of name P. J. Gaylor, assignors to Standard Oil Development Co., a corporation of Delaware.

2,209,246. **Accelerating Polymerization of Styrene, Esters, Amides, Nitriles, Etc.,** in the Presence of Tetralin Peroxide. (Synthetic.) W. Bauer, Darmstadt, and E. Trommsdorff, Jugenheim-on-the-Bergstrasse, both in Germany, assignors to Röhm & Haas Co., Philadelphia, Pa.

2,209,333. **Production of Rubber-Like Materials** from Impure Petroleum Hydrocarbons. (Synthetic.) E. W. Hultman, Larchmont, assignor to Hultene Rubber Corp., New York, both in N. Y.

2,209,451. **Acoustic Cement** Containing a Rubber Base. H. D. Geyer, Dayton, O., assignor to General Motors Corp., Detroit, Mich.

2,209,746. **Continuous Polymerization of Butadiene** in the Presence of an Alkali Metal Catalyst. (Synthetic.) G. Ebert, R. Heidebrock, and P. Orth, all of Ludwigshafen-on-the-Rhine, Germany, assignors, by mesne assignments, to Jasco, Inc., a corporation of La.

2,209,928. **Oil-, Water-, and Ozone-Resistant Electrical Insulating Composition** Comprising the Reaction Product of Polymerized Chloroprene, Polymerized Acrylic Acid Derivative, and a Vulcanizing Agent. (Synthetic.) P. Nowak and H. Hofmeier, both of Berlin-Charlottenburg, Germany, assignors to General Electric Co., a corporation of N. Y.

Dominion of Canada

389,754. **Stabilization of Proteolytic Enzyme** from Ficus Latex. Merck & Co., Inc., assignee of W. H. Engels, both of Rahway, and G. A. Stein, Elizabeth, co-inventors, all in N. J., U. S. A.

389,879. **Rubber Derivative**—Composition Comprising a Blend of Rubber Hydrochloride and Terpene Hydrochloride. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of J. McGavack, Leonia, N. J., U. S. A.

389,891. **Reclaiming Rubber** by Heating It in the Presence of a Thiophenol. B. F. Goodrich Co., New York, N. Y., assignee of B. St. J. Garvey, Akron, O., both in the U. S. A.
389,923. **Accelerator**—Reaction Product of a 2-Mercaptoarylthiazole and a Halodioxane. Wingfoot Corp., Wilmington, Del.,assignee of A. M. Clifford, Stow, O., both in the U. S. A.
389,924. **Accelerator**—Cyclohexanonyl Dimethyl Dithiocarbamate. Wingfoot Corp., Wilmington, Del., assignee of J. G. Lichty, Stow, O., both of the U. S. A.
389,925. **Accelerator**—Reaction Product of a Dithio Acid and a Halo Ketone. Wingfoot Corp., Wilmington, Del., assignee of J. G. Lichty, Stow, O., both in the U. S. A.
389,926. **Accelerator**—Reaction Product of Sulphur and a 2-Amino Benzothiazole. Wingfoot Corp., Wilmington, Del., assignee of J. G. Lichty, Stow, O., both in the U. S. A.
389,927. **Accelerator**—Addition Product of a Diaryl Guanidine and an Alkyl Isothiocyanate. Wingfoot Corp., Wilmington, Del., assignee of G. W. Watt, Austin, Texas, both in the U. S. A.
389,928. **Accelerator**—2-Arylene Thiazyl-2-Thio Thiodiazole. Wingfoot Corp., Wilmington, Del., assignee of G. W. Watt, Austin, Texas, both in the U. S. A.
390,221. **Beta-Halogen-Butadiene-1,3.** (Synthetic.) I. G. Farbenindustrie, A. G., Frankfurt, a.M., assignee of H. Lange and O. Horn, co-inventors, both of Frankfurt a.M.-Hoechst, all in Germany.
390,316. **Rubber Softener**—Thio-Carboxylic Acid Compound. Canadian Industries, Ltd., Montreal, P. Q., assignee of L. L. Smith, Carney's Pt., executrix of the estate of C. C. Smith, deceased, in his lifetime of Carney's Pt., and I. Williams, Woodstown, co-inventor with C. C. Smith, all in N. J., U. S. A.
390,339. **Accelerator**—2-Mercapto Pyridine Compound. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of L. H. Howland, Nutley, N. J., U. S. A.
390,373. **High Molecular Weight Polymers** Made by Reacting Mono-Olefins with Sulphur Dioxide. (Synthetic.) Phillips Petroleum Co., assignee of R. D. Snow, both of Bartlesville, Okla., U. S. A.
390,499. **Styrene** from an Alkyl-Substituted Benzol. (Synthetic.) Carbide & Carbon Chemicals, Ltd., Toronto, Ont., assignee of O. H. Smith, West Englewood, N. J., U. S. A.

United Kingdom

518,490. **Composite Resilient Materials.** B. F. Goodrich Co.
518,697. **Dichlorobutenes.** W. W. Groves (I. G. Farbenindustrie A.G.).
518,718 and 518,719. **Rubber-Like Compositions.** W. T. Henley's Telegraph Works Co., Ltd., H. A. Tunstall, and B. B. Evans.
519,047. **Synthetic Rubber-Like Materials.** I. G. Farbenindustrie A.G.
519,095. **Rubber Compositions, and Articles Thereof.** Liverpool Electric Cable Co., Ltd., and L. T. Reynolds.
519,617. **Mercaptobenzthiazole Derivatives.** W. Baird, A. G. Murray, and Imperial Chemical Industries, Ltd.
519,730. **Synthetic Rubber-Like Materials.** I. G. Farbenindustrie A.G.
519,731. **Polymeric Products of Rubber-Like Character.** (Synthetic.) I. G. Farbenindustrie A.G.
519,998. **Plasticizing Rubber.** E. I. du Pont de Nemours & Co., Inc.
520,022. **Production and Application of Synthetic Rubber-Like Materials.** B. J. Habgood, E. Isaacs, L. B. Morgan, and Imperial Chemical Industries, Ltd.
520,097. **Production of Natural Rubber and Artificial Rubber-Like Masses.** I. G. Farbenindustrie A.G.
520,358. **Reclaiming Rubber.** V. Merz.
520,505. **Plasticizing Polymeric Organic Sulphides.** Imperial Chemical Industries, Ltd.
520,653. **Plasticizing Rubber.** M. Jones, C. F. Flint, and Imperial Chemical Industries, Ltd.
520,717. **Aliphatic Ketone-Diarylamine Antioxidants.** United States Rubber Products, Inc.
520,745. **Treatment of Polymerized Chloroprene.** (Synthetic.) B. B. Chemical Co., Ltd., L. E. Puddefoot, and J. A. Wilson.
520,813. **Preservation of Rubber.** United States Rubber Co.
520,818. **Accelerators.** United States Rubber Co.
520,985. **Thermoplastic Rubber Materials.** Imperial Chemical Industries, Ltd.
521,007. **Resinous Rubber Transformation Products.** Albert Products, Ltd.
521,108. **Treatment of Regenerated Cellulosic Materials** to Render Them Unitable to Rubber. H. Dreyfus.
521,277. **Synthetic Rubber-Like Materials.** I. G. Farbenindustrie, A.G.
521,401. **Rubber-Bitumen Mixtures.** A. J. Myles, R. S. Clare & Co., Ltd., and Challoner & Wettern, Ltd.
521,436. **Preparation of Purified Latex and the Preparation of Rubber, Gutta Percha, Balata, Etc., Therefrom.** Rubber-Stichting.
521,545. **Synthetic Rubber-Like Materials.** B. J. Habgood, E. Isaacs, L. B. Morgan, and Imperial Chemical Industries, Ltd.
521,576. **Aliphatic Ketone-Diarylamine Antioxidants.** United States Rubber Products.
521,578. **Treatment of Rubber and similar Oxidizable Substances.** United States Rubber Co.
521,764. **Rubber-Like Compositions.** Craigpark Electric Cable Co., Ltd., and J. R. M. Duncan.
522,171. **Plastic Self-Hardening Compositions.** J. H. Carrington, F. S. Roberts, and Rubber Cement Products, Ltd.
522,172 and 522,173. **Plastic Self-Hardening Compositions.** P. P. B. Cormac and Rubber Cement Products, Ltd.
522,235. **Corrosion Inhibitors.** United States Rubber Co.
522,401. **Aliphatic Ketone-Diarylamine Antioxidants.** United States Rubber Products, Inc.

GENERAL

United States

21,509. **Face Lifter.** (Reissue.) M. L. McLaughlin, Fairfield, Conn.
2,206,023. **Vehicle Guard.** W. C. Broadwell, New York, N. Y.
2,206,078. **Auto Assist Strap.** G. R. Cunnington, Grosse Pointe Park, assignor to National Automotive Fibres, Inc., Detroit, both in Mich.
2,206,118. **Sealed Bottle.** J. J. Pahls and A. C. J. Tamm, both of St. Louis, Mo., assignors to Anchor Cap & Closure Corp., Long Island City, N. Y.
2,206,122. **Storage Battery.** C. H. Rasch, North Tonawanda, N. Y.
2,206,158. **Tire Pressure Gage Signal.** F. Budd, Wichita, Kans.
2,206,159. **Soap Dish.** C. J. Burgard, St. Louis, Mo.
2,206,230. **Solid Tire Vehicle Wheel.** J. O. Maccabee, New York, N. Y.
2,206,244. **Vibrator.** C. S. Weyandt, Pittsburgh, Pa.
2,206,301. **Wringer Roll Stop Mechanism.** V. E. Dunn, Fairfield, Iowa.
2,206,302. **Wringer Roll Stop Mechanism.** V. E. Dunn, Alliance, O.
2,206,343. **Windshield Wiper Blade Attachment.** M. Zaiger, Swampscott, Mass.
2,206,368. **Internal Bath Apparatus.** F. M. Ross, New York, N. Y.
2,206,402. **Bathing Cap.** T. J. Howland, Long Branch, N. J.
2,206,457. **Mechanical Pencil Eraser.** A. S. Dysart, Onoville, N. Y.
2,206,463. **Compressor Support.** B. W. Jewell, Dayton, O., assignor, by mesne assignments, to Chrysler Corp., Highland Park, Mich.
2,206,469. **Wringer Roll Safety Means.** J. E. Peterson and E. Saul, both of Camden, N. J.
2,206,481. **Device to Treat Sinus Infections.** F. J. Luchs and A. D. Fischer, both of Washington, D. C.
2,206,505. **Sport Trousers.** S. Klein, assignor to S. Simpson, Ltd., both of London, England.
2,206,621. **Pneumatic Tire Tube.** E. A. Smith, New York, N. Y.
2,206,672. **Connector** for Flexible Elastic Strand. E. G. J. Pederquist, assignor to Rajah Co., both of Bloomfield, N. J.
2,206,687. **Pneumothorax Apparatus.** J. L. Bloomheart, assignor to M. F. McKesson, both of Toledo, O.
2,206,726. **Rubber Toothbrush.** R. L. Lasater, Evanston, Ill.
2,206,737. **Combination Automobile Wheel and Safety Tire.** G. Tomsic, New York, N. Y.
2,206,814. **Windshield Clearing System.** E. C. Horton, Hamburg, assignor to Trico Products Corp., Buffalo, both in N. Y.
2,206,822. **Automatic Windshield Cleaner.** R. E. Rousseau, assignor to Trico Products Corp., both of Buffalo, N. Y.
2,206,860. **Shoe** with Slat-Tread Sole. P. A. Sperry, New Haven, Conn.
2,206,900. **Method of Lasting Shoes.** (Latex.) H. C. King, Quincy, Mass., assignor to United Shoe Machinery Corp., Borough of Flemington, N. J.
2,206,901. **Motor Vehicle Wheel Suspension.** P. Klotsch, assignor to Briggs Mfg. Co., both of Detroit, Mich.
2,206,950. **Flexible Doll.** M. T. Gregg, Tamworth, N. H.
2,206,972. **Ball and Socket Type of Joint.** R. W. Niles, Saline, assignor to Hoover Ball & Bearing Co., Ann Arbor, both in Mich.
2,207,025. **Aquatic Amusement Floating Device.** R. L. Rison, Washington, D. C.
2,207,059. **Trailer Coupling Eye.** G. N. Herring, assignor of one-half to W. W. Cockrill, both of Fresno, Calif.
2,207,077. **Automatic Mechanism for Button Punch.** F. Stott, St. Albans, assignor, by mesne assignments to Buttondex Corp., New York, both in N. Y.
2,207,091. **Shoe Sole Protector.** H. H. Fetterling and E. V. Simon, both of Pomona, Calif.
2,207,099. **Tire Tread** with Plurality of Flexible Insets. C. E. Maynard, Northampton, Mass., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.
2,207,101. **Tire Tread** Having Cuts with Opposing Contacting Faces. C. E. Maynard, Northampton, Mass., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.
2,207,107. **Resilient Mounting** for Loom Binders. O. V. Payne, Leicester, assignor to Crompton & Knowles Loom Works, Worcester, both in Mass.
2,207,147. **Radiator Shutter Unit.** G. A. Gilbertson, assignor to Pines Winterfront Co., both of Chicago, Ill.
2,207,153. **Electric Nerve Injection Model of the Spine.** B. D. Judovich, Philadelphia, Pa.
2,207,165. **Arch Support.** W. Seigle, Hinton, Okla.
2,207,176. **Squirt Can** with Resilient Spout. H. J. Phillips, South Gate, Calif.
2,207,212. **Safety Inner Tube** (Double-Type). G. C. Arey, Indian Hill, O.
2,207,215. **Wringer and Drainboard Apparatus.** J. C. Clapper and D. A. Constance, both of Altoona, Pa.
2,207,278. **Squeeze-Belt Machine** for Removing Surface Moisture from Lump Material. J. A. Albrecht, Buffalo, N. Y.
2,207,294. **Compressible Spraying Receptacle.** G. Hubner and W. Friedrichs, Berlin, Germany.
2,207,296. **Refillable Typewriter Eraser.** A. D. Lee, Lodi, Calif.
2,207,352. **Shaft Bearing Mounting.** W. B. Moore, assignor to Timken Roller Bearing Co., both of Canton, O.
2,207,371. **Annular Fluid Sealing Device.** L. Blackmore, Detroit, and H. D. Seelinger, Highland Park, assignors to General Motors, Corp., Detroit, all in Mich.
2,207,406. **Auto Collision and Theft Signaling Device.** S. H. Jones, West Allis, Wis.
2,207,436. **Safety Device for Wringers.** C. G. Lundstrom, Des Moines, assignor of one-fourth to A. Anstrom, Boone, both in Ia.
2,207,444. **Mine Car Bumper.** E. R. Schroeder, Hawthorne, N. J., assignor to American Car & Foundry Co., New York, N. Y.
2,207,451. **Traction Pull Rim for Tires.** W. F. Betzell, Washington, D. C.
2,207,465. **Auto Wheel Suspension.** J. W. Leighton, Port Huron, Mich.
2,207,492. **Suction Gripper.** G. Spiess, Leipzig, Germany.
2,207,496. **Power Transmission Torsional Coupling.** C. J. Anderson, Jr.; E. W. Anderson, executrix of C. J. Anderson, deceased, assignor to E. W. Carlson, all of Jamestown, N. Y.
2,207,614. **Surgical Finger Device.** S. I. Copen, Boston, Mass.
2,207,632. **Resilient Insole.** M. Margolin, Elgin, Ill.
2,207,636. **Tire Traction Lug.** S. E. Opperman, Barnet, England.
2,207,641. **Composite Yarn** Comprising Intertwined Elastic and Inelastic Threads. W. D. Smith, Philadelphia, Pa.
2,207,672. **Rubber Thimble.** A. M. Levey, Pine Bluff, Ark.
2,207,756. **Rubber Hand Stamp.** C. B. Parker, Washington, D. C.
2,207,825. **Traction Device** for Rubber Tired Tractor Wheels. T. G. Schmeiser, Fresno, Calif.
2,207,826. **Tire Traction Device.** T. G. Schmeiser, Fresno, Calif.
2,207,833. **Universal Foot Support.** H. E. Stark, assignor to Dr. Wood's Foot Appliance Co., both of Chicago, Ill.
2,207,848. **Railway Truck.** D. S. Barrows, assignor to Symington-Gould Corp., both of Rochester, N. Y.
2,207,932. **Moistening Means** for Duplicating Machines with Latex Impregnated Roller Coverings. R. F. Morrison, Oak Park, assignor to Ditto, Inc., Chicago, both in Ill.
2,207,970. **Counter Stool Back** Held by Bolts with Rubber Washers. E. L. Cederquist, Los Angeles, Calif.
2,207,971. **Tire Chain.** F. P. Chaussee, Missoula, Mont.
2,208,047. **Ventilated Printing Roll.** P. H. Durup, Wollaston, assignor to Artographic, Inc., Boston, both in Mass.
2,208,060. **Method of Preparing a Laminated Container Material** Containing Rubber Hydrochloride. M. Wagner, assignor to Liquid Carbonic Corp., both of Chicago, Ill.
2,208,078. **Foot Correction Arch Support** with Sponge Rubber Pads. B. H. Lobdell, Pittsburgh, Pa.
2,208,080. **Highway Marking Protector.** E. W. Overdorff, Johnstown, Pa.
2,208,082. **Latex-Cork Expansion Joint Filling.** W. J. Randall, Lenton, Nottingham, England.
2,208,084. **Resilient-Bladed Fan.** E. Ryder, Berwyn, Ill.
2,208,086. **Toy Paddle** with Elastic-Attached Ball. H. Singer, assignor of one-half to W. S. Chang, both of Honolulu, Hawaii.
2,208,089. **Breast Pump.** D. von Grolman, Buenos Aires, Argentina.
2,208,115. **Shirt Suit** with Resilient Waist Line. G. Cantil, Great Neck, N. Y.
2,208,155. **Vehicle Lamp** with Rubber Base. J. W. Daehler, Los Angeles, Calif.
2,208,248 and 2,208,249. **Wringer.** N. L. Etten, Waterloo, Ia.

2,208,250. **Gearshift Roll Stop Wringer.** N. L. Etten, Waterloo, Ia.
2,208,275. **Artificial Knee.** J. J. McCann, Burlington; J. Conner French, Mercer County, and J. A. McCann, Burlington, executors of J. J. McCann, deceased, all in N. J.
2,208,280. **Rubber Heel.** A. Santacroce and A. Milshow, both of Cleveland, O.
2,208,300. **Stocking.** S. I. and M. M. Burd, both of Philadelphia, Pa.
2,208,305. **Rubber-Like Product** Comprising a Vulcanized Mixture of Olefine Polysulphide and a Reaction Product of Glycerol Phthalate with a Polymer of Vegetable Oil. H. G. Kittredge, assignor to Kay & Ess Chemical Corp., both of Dayton, O.
2,208,314. **Universal Joint.** J. R. Snyder, Detroit, Mich.
2,208,330. **Shoe** with Rubber Heel Wedge. L. M. Oakley, assignor to Essex Rubber Co., both of Trenton, N. J.
2,208,360. **Nursing Bottle.** F. M. Duerme, Chicago, Ill.
2,208,365. **Ski Pole Grip.** S. Gerber, Seattle, Wash.
2,208,537 and 2,208,538. **Vehicle Suspension.** R. W. Brown, assignor to Firestone Tire & Rubber Co., both of Akron, O.
2,208,539. **Fluid Pressure Valve Control.** R. W. Brown, assignor to Firestone Tire & Rubber Co., both of Akron, O.
2,208,540. **Vehicle Suspension.** R. W. Brown, assignor to Firestone Tire & Rubber Co., both of Akron, O.
2,209,305. **Fruit Pitter.** G. W. Ashlock, Jr., Oakland, Calif.
2,209,388. **Sanitary Bedpan Pad.** F. Cox, Ada, Okla.
2,209,403. **Rubber Wall Sheathing** and Method of Applying It. R. H. Kittner, Shaker Heights, and K. J. Durant, Akron, both in O., assignors to American Hard Rubber Co., New York, N. Y.
2,209,410. **Electric Circuit** for Fuel Burners. E. G. Lowrey, Bristol, R. I., assignor to United States Rubber Co., New York, N. Y.
2,209,422 and 2,209,423. **Clothes Wringer.** S. E. Schroeder, assignor to Electric Household Utilities Corp., both of Chicago, Ill.
2,209,570. **Laminated Container** for Corrosive Liquids. H. T. Kraft, assignor to General Tire & Rubber Co., both of Akron, O.
2,209,578. **Split Oil Seal and Gasket.** (Synthetic.) R. S. Rainey, Wheaton, and T. O. Kosatka, Cicero, assignors to Victor Mfg. & Gasket Co., Chicago, all in Ill.
2,209,743. **Insulating Pad** for Electrical Junctions. C. P. Xenis, Little Neck, L. I., assignor to Consolidated Edison Co. of New York, Inc., New York, both in N. Y.
2,209,752. **Magnesium Carbonate Composition and Process for the Preparation Thereof.** S. A. Abrahams, San Francisco, R. Lewon, Menlo Park, and L. L. Collonge, Palo Alto, assignors to Plant Rubber & Asbestos Works, San Francisco, all in Calif.
2,209,753. **Magnesium Carbonate Composition and Method of Preparation.** S. A. Abrahams, San Francisco, and R. Lewon, Menlo Park, assignors to Plant Rubber & Asbestos Works, San Francisco, all in Calif.
2,209,754. **Self-Set Magnesium Carbonate Composition and Method of Effecting Setting Thereof.** S. A. Abrahams, San Francisco, and R. Lewon, Menlo Park, assignors to Plant Rubber & Asbestos Works, San Francisco, all in Calif.
2,209,789. **Mirror for Lipsticks.** C. A. Mureau, Los Angeles, Calif.
2,209,814. **Electrical Plug Connector.** C. H. Finger, Milford, Conn., assignor to General Electric Co., a corporation of N. Y.
2,209,863. **Engine Mounting.** R. S. Trott, Denver, Colo.

Dominion of Canada

389,814. **Anti-Slip Fitting** for Vehicle Wheels. C. M. Collins, Houston, Renfrewshire, and W. M. Henderson, Glasgow, co-inventors, both in Scotland.
389,818. **Bicycle or Exercise Machine.** G. Bottos, Mimico, Ont.
389,827. **Adhesive Tape and Plaster.** C. R. Hill, Toronto, Ont.
389,831. **Paste Container.** C. R. Klok, Tipler, Wis., U. S. A.
389,838. **Tire** with Plurality of Inner Tube Sections. A. J. Michaud, Montreal, P. Q.
389,862. **Paper Making Machine** with Rubber Cushioned Supports. Black-Clawson Co., assignee of H. L. Kutter, Hamilton, O., U. S. A.
389,887. **Vibration Dampener.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of C. Saurer, Akron, O., U. S. A.
389,911. **Cutting-Off Wheel.** Norton Co., assignee of D. E. Webster, Worcester, Mass.
389,912. **Chewing Gum.** Peter Paul, Inc., Naugatuck, assignee of C. H. Flint, Westport, both in Conn., U. S. A.
389,935. **Garment Hanger.** C. A. Isaacson, St. Paul, inventor, and Merchant & Merchant, a partnership composed of F. D., H. M., and R. F. Merchant, Minneapolis, assignee of fifty one-hundredths of the interest, all in Minn., U. S. A.
389,964. **Backhand Pencil Pointer.** B. K. Dobkowitz, San Francisco, Calif., U. S. A.
389,971. **Safety Tire Tube.** J. E. Leclerc, St. Hyacinthe, P. Q.
390,006. **Cushioning Member** for Potato Digger Chain. Champion Corp., assignee of A. T. Knoerzer, both of Hammond, Ind.
390,011. **V-Belt.** Dayton Rubber Mfg. Co., assignee of A. L. Freedlander, both of Dayton, O., U. S. A.
390,022. **Resilient Engine Support.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of C. Saurer, Akron, O., U. S.A.
390,181, 390,182, and 390,183. **Resilient Wheel.** Svenska Aktiebolaget Bromsregulator, assignee of N. G. A. Malmquist, Malmö, Sweden.
390,204. **Refrigerator Ice Tray Grid.** R. L. Hallock, Larchmont, N. Y., U. S. A.
390,255. **Resilient Car Wheel.** A. J. Hersey and C. L. Madden, co-inventors, both of Minneapolis, Minn., U. S. A.
390,283. **Dispensing Container Cap** with Rubber Tube. R. E. Salvesen, Forest City, Iowa, U. S. A.
390,290. **Support** for Abrasive Disk. Albertson & Co., Inc., assignee of F. O. Albertson, both of Sioux City, Iowa, U. S. A.
390,297. **Pressure Operated Electric Switch.** Automatic Telephone & Electric Co., Ltd., London, assignee of S. R. Smith, Fairfield, Liverpool, and C. H. Brizell, Roby, near Liverpool, co-inventors, all in England.
390,337. **Fastener Element Shaping Apparatus.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of E. J. Tuttle, Waterbury, Conn., U. S. A.
390,367. **Paper Bag** Coated with Rubber Hydrochloride. Marbon Corp., assignee of F. E. Williams, both of Gary, Ind., U. S. A.
390,369. **Pressure Sensitive Adhesive Sheeting.** Minnesota Mining & Mfg. Co., assignee of R. G. Drew, both of St. Paul, Minn., U. S. A.
390,370. **Vehicle Wheel Rim.** Motor Wheel Corp., assignee of J. H. Hunt, both of Lansing, Mich., U. S. A.
390,397. **Engine Mounting.** Wright Aeronautical Corp., Paterson, N. J., assignee of E. S. Taylor, Cambridge, Mass., both in the U. S. A.
390,429. **Bottle Jacket.** E. Alwardt, Kiel-Gaarden, Germany.
390,436. **Medicament Applying Apparatus.** H. Fromm, London, England.
390,464. **Skid Chain.** G. L. Briggs, Oneida, N. Y., U. S. A.
390,523. **Typewriter.** International Business Machines Corp., New York, N. Y., assignee of J. J. Noonan, St. Louis, Mo., U. S. A.
390,530. **Engine Mounting** Having Rubber Bushings. Lord Mfg. Co., assignee of Lord Mfg. Co., a partnership comprising H. C. Lord and B. M. Hartman, both of Erie, Pa., assignee of W. E. Stitz, Dayton, O., all in the U. S. A.

United Kingdom

518,460. **Elastic-Joint Packings.** Ural-Maschinen-Vertriebs-Ges.
518,463. **Aircraft De-Icer.** J. N. Wynne and North British Rubber Co., Ltd.
518,504. **Windscreen Wipers.** W. Dudley.
518,601. **Pneumatic Tires.** John Bull Rubber Co., Ltd., and H. H. Burton.
518,609. **Wearing Apparel of Elastic Material.** T. J. Howland.
518,809. **Vehicle Wheels** with Demountable Rims. Akt.-Ges. Der Eisen-und Stahlwerke Vorm. G. Fischer.
518,880. **Aircraft Undercarriages.** Firestone Tire & Rubber Co., Ltd.
518,920. **Windscreen Wiper Blades and Methods of Assembly Thereof.** W. E. O'Shei and Trico-Folberth, Ltd.
519,007. **Tire Deflation Indicating Means.** W. Bock.
519,217. **Suspenders.** H. J. Bayon.
519,239. **Cables.** C. J. Beaver, R. C. Leishman, and W. T. Glover & Co., Ltd.
519,324. **Storage Batteries.** J. R. Parkington.
519,690. **Coupling Devices** for Use with Hose and Like Pipes. Sanbra, Ltd., and P. N. Dingley.
519,744. **Cables.** Standard Telephones & Cables, Ltd., (G. Deaken).
519,753. **Rubber Knickers.** W. W. Triggs, (Deutsche Kabelwerke Akt.-Ges.).
519,816. **Raincoats, Etc.** T. D. Stewart.
519,832. **Wringing and Mangling Machines.** Taylor & Wilson, Ltd., A. Kennedy, and J. Bridge.
519,840. **Reels** for Fire Hose, Etc. Minimax, Ltd., and J. J. Vanner.
519,862. **Cables.** Siemens Bros. & Co., Ltd., and H. G. Wood.
519,863. **Cables.** Siemens Bros. & Co., Ltd., H. G. Wood, and J. Riedl.
519,875. **Massaging Rollers.** J. Folley.
519,877. **Vehicle Suspensions.** Firestone Tire & Rubber Co., Ltd.
520,023. **Cables.** Norddeutsche Kabelwerke A.G.
520,053. **Wheel Rims.** S. H. Grylls.
520,095. **Elastic Threads and Yarn and Fabrics Therefrom.** T. L. Shepherd.
520,379. **Vehicle Wheels.** T. R. Reeves.
520,409. **Electric Cable Systems.** Okonite-Callender Cable Co., Inc.
520,433. **Valves** for Controlling Fluid under Pressure. India-Rubber, Gutta Percha & Telegraph Works Co., Ltd., F. J. Tarris, and D. Webb.
520,439. **Rubber-Shod Wheels.** T. B. Andree Rubber Co., Ltd., and T. Gillett.
520,559. **Gloves.** Dunlop Rubber Co., Ltd., G. B. Ainsworth, and L. Harral.
520,640. **Yarn and Fabric Incorporating This Yarn.** Lastex Yarn & Lactron Thread, Ltd., R. G. James, and J. G. Healey.
520,671. **Flexible Couplings.** General Tire & Rubber Co.
520,841. **Fabric Containing Rubber Threads.** L. Deutsch.
520,846. **Cables.** Kabushiki Kaisha Sumitomo Densen Seizosho.
520,858. **Golf Bags, Etc.** Leyland & Birmingham Rubber Co., Ltd.
520,944. **Resilient Wheel Mountings** for Aircraft Undercarriages. G. H. Dowty.
520,965. **Pile Fabrics.** F. S. Roberts and Revertex Sales Co., Ltd.
520,987. **Tires.** J. V. Martin.
520,996. **Insulated Electrical Coils.** T. F. Altham and Transformers & Welders, Ltd.
521,030. **Sealing Punctures** in Pneumatic Tubes. R. W. Hughes and Tubalin, Ltd.
521,045. **Accumulator Batteries,** Particularly for Motor Vehicles. M. Foltini.
521,053. **Resilient Mountings.** C. A. Voigt.
521,067. **Erasing Device.** W. Denhof.
521,084. **Storage Batteries.** Ceag, Ltd., and R. J. Plummer.

TRADE MARKS

United States

379,207. Representation of two concentric circles containing three pyramidal spokes. Inner tubes and packings. Daimler-Benz A. G., Stuttgart-Unterturkheim, Germany.
379,219. **Cats Meow.** Rubber sound toy. B. Richter, doing business as Ben Richter Co., New York, N. Y.
379,253. Representation of a black and white illustration depicting three opened pieces of luggage. Syringes and parts thereof. Faultless Rubber Co., Ashland, O.
379,327. **Betanox.** Antioxidants for natural or synthetic rubber. United States Rubber Co., New York, N. Y.
379,340. Representation of white herringbone design on a black bar. Inner tubes. Cupples Co., St. Louis, Mo.
379,395. Representation of a circle containing drawing of a natural bridge. Shoes. Craddock-Terry Shoe Corp., Lynchburg, Va.
379,415. Representation of a shoe containing a recumbent man on the inner sole. Shoes. Spencer Shoe Corp., Boston, Mass.
379,438. **Gold and Black.** Inner tubes. B. F. Goodrich Co., New York, N. Y.
379,446. Representation of two concentric circles superimposed on a triangle between the words: **"Blue Seal."** Tires. Illinois Farm Supply Co., Chicago, Ill.
379,453. **"Slimpac."** Corsets. Artistic Foundations, Inc., New York, N. Y.
379,476. **"Bonfra."** Corsets. Bonwit Teller, Inc., New York, N. Y.
379,480. **Hy-Glo.** Toy balloons. Oak Rubber Co., Ravenna, O.
379,517. **Bubblo.** Chewing gum. Gumakers of America, Inc., Clifton Heights, Pa.
379,628. **Uskide.** Heels and lifts. United States Rubber Co., New York, N. Y.
379,634. Representation of a girl holding aloft a ball. Girdles. International Latex Corp., Dover, Del.
379,635. **Live and play this Playtex way!** Girdles. International Latex Corp., Dover.
379,644. Representation of a kneeling native girl juggling bubbles, and the words: **"Royal Foam."** Foamed rubber mattresses. United States Rubber Co., New York, N. Y.
379,645. **Banner.** Tires. Crown Products Co., Ralston, Nebr.
379,673. **"Nepco-Seal."** Electrical conductors and cables. National Electric Products Corp., Pittsburgh, Pa.
379,738. **Synthal.** Raincoats. United States Rubber Co., New York, N. Y.
379,744. **Emerson Super Master.** Tires. A. Meyerowitz, New York, N. Y.
379,761. **Macette.** Corsets. Poirette Corsets, Inc., New York, N. Y.
379,855. Representation of red threads running longitudinally of the belt in each individual fabric ply, which red threads are woven into the several plies of fabric. Multiple ply belts. Ton-Tex Corp., Grand Rapids, Mich.
379,934. **Motor Chief.** Tires. Mohawk Rubber Co., Akron, O.
379,936. **Firestone Champion.** Tire repairs. Firestone Tire & Rubber Co., Akron, O.
379,937. **Regent.** Tires and tubes. Gamble Stores, Inc., Minneapolis, Minn.
379,938. **Mutac.** Tire repairs. Firestone Tire & Rubber Co., Akron, O.

Market Reviews

CRUDE RUBBER

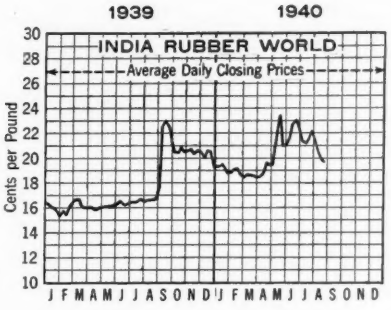
Commodity Exchange

TABULATED WEEK-END CLOSING PRICES ON THE NEW YORK MARKET

Futures	June 29	July 27	Aug. 3	Aug. 10	Aug. 17	Aug. 24
			"New" Standard			
July ..	21.25	21.25	.....	.....	.....	.....
Aug. ..	19.91	19.55	19.40	19.32	19.29	19.17
Sept...	18.63	19.29	19.25	19.07	19.29	19.17
Dec. ..	17.49	18.50	18.90	18.79	19.00	18.95
Mar. ..	17.15	18.30	18.70	18.59	18.83	18.85
June ..	.....	18.20	18.55	18.49	18.66	18.75
July ..	.....	.....	18.55	18.49	18.66	18.75
			No. 1 Standard			
Aug. ..	20.16	19.75	19.65	19.57	19.54	19.42
Sept...	18.88	19.49	19.50	19.32	19.54	19.42
Dec. ..	17.74	18.65	19.05	18.99	19.20	19.20
Mar. ..	17.30	18.40	18.85	18.79	19.03	18.98
May ..	17.23	18.35	18.70	18.59	18.86	18.88
Volume (tons) per week "New" Standard...	50	30	540	80	30	180
No. 1 Standard...	7,420	2,440	5,700	2,510	2,270	4,810

THE rubber market ruled generally steady during the past month, and September futures (old contract) after closing at 19.37¢ per pound on July 31, fluctuated within narrow limits throughout August to close at the slightly higher level of 19.42¢ per pound on August 23. The closing price on August 29 was 19.07¢ per pound with the market weaker. Trading during the month was light.

The outstanding development during August was the announcement by Jesse Jones, Federal Loan Administrator, that the Rubber Reserve Co. had signed an agreement with the International Rubber Regulation Committee to purchase an added 180,000 tons of crude rubber in 1941. The announcement did not affect the rubber market; trade circles held that the effect of the rubber purchasing policy would be to stabilize the price of rubber within the range set in the current agreements, provided that there were no further price structure disturbances resulting from international complications.



New York Outside Market—Spot Ribbed Smoked Sheets

During the early part of August some concern was felt over Japan's political moves in Asia and reported extensive purchases of rubber by that country in the Far East.

Contrary to trade expectations United States crude rubber consumption during July increased 1.1% over the June figure to 47,011 long tons. Crude rubber consumption during the first half of August was reported to be at the July level. Increased demand during the latter part of August pointed toward an early fall pick-up in rubber manufacturing activity.

The Commodity Exchange, Inc., reported last month the nationality of steamers importing rubber into the Port of New York as follows: 1938—U. S., 18.7%; British, 58.5%; Japanese, 6.5%; Dutch, 15.4%; Norwegian, 0.9%; 1940—U. S., 26.6%; British, 27.2%; Japanese, 9.5%; Dutch, 22.8%; Norwegian, 10.1%; Swedish, 0.6%; Greek, 1.9%; Italian, 1.3%.

The Dutch East Indies have applied a 5% ad valorem war export duty to rubber, tin, quinine, and petroleum products, effective August 11, according to the U. S. Department of Commerce.

New York Quotations

New York outside market rubber quotations in cents per pound

	Aug. 28, 1939	July 29, 1940	Aug. 27, 1940
Latex			
Normal, 38-40%..gal.	64/65	77/80	75/77
Centrifuged, 60-63% .....gal.	..	..	1.30/1.32
Paras			
Upriver fine.....	14½	18¼	17¼
Upriver fine.....	*17⅜	*20½	*18⅛
Upriver coarse....	10¾	11¾	10¼
Upriver coarse....	*15½	*18½	*16
Islands fine.....	14¾	18	16½
Islands fine.....	*17	*20	*18
Acre, Bolivian fine	14¾	18½	17½
Acre, Bolivian fine	*17½	*21	*19
Beni, Bolivian fine	15¼	19¾	18¾
Madeira fine	14½	18¼	17¼
Caucho			
Upper ball.....	10¼	11¾	10¼
Upper ball.....	*15½	*18½	*16
Lower ball.....	9¾	11	10
Pontianak			
Pressed block.....	9/15	20½/25	20/24
Guayule			
Ampar	13¼	15	15¼
Africans			
Rio Nuñez.....	16	18½	18½
Black Kassai.....	16	18½	18½
Prime Niger flake.	20	22½	22½
Gutta Percha			
Gutta Siak	9½	23	22
Gutta Soh.....	15	29	30¾
Red Macassar....	1.20	1.20	1.20
Balata			
Block Ciudad Bolivar	..	..	45
Manaos block.....	30	56	55
Surinam sheets...	40	62	53
Amber	43	68	55

* Washed and dried crepe. Shipments from Brazil.

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	July, 1940								August, 1940													
	22	23	24	25	26	27†	29	30	31	1	2	3†	5	6	7	8	9	10†	12	13	14	15	16	17†
No. 1-X R.S.S. in cases*..	22¼	22¼	22	22	22	..	21½	21½	21¼	20¾	20¾	..	20¾	20¾	20½	20⅜	20⅛	..	20	20	20	20	19⅞	..
No. 1 Thin Latex Crepe.....	22¼	22¼	22	22	22	..	21¼	21¼	21	20	20	..	20	20	19¾	19⅝	19⅝	..	19¾	19¾	19¾	19¾	19⅝	..
No. 2 Thick Latex Crepe....	22¼	22¼	22	22	22	..	21¼	21¼	21	20	20	..	20	20	19¾	19⅝	19⅝	..	19¾	19¾	19¾	19¾	19⅝	..
No. 1 Brown Crepe.....	21	21	20¾	20¾	20¾	..	20½	20½	20¼	19¼	19¼	..	19¾	19¾	19½	19⅜	18⅝	..	18⅝	18⅝	18⅝	18⅝	18½	..
No. 2 Brown Crepe.....	20¾	20¾	20½	20½	20½	..	20	20	19¾	19	19½	..	19½	19½	19¼	19⅛	18¼	..	18¼	18¼	18¼	18¼	18⅛	..
No. 2 Amber.....	21	21	20¾	20¾	20¾	..	20½	20½	20¼	19¼	19¼	..	19¾	19¾	19½	19⅜	18⅝	..	18⅝	18⅝	18⅝	18⅝	18½	..
No. 3 Amber.....	20¾	20¾	20½	20½	20½	..	20	20	19¾	19	19½	..	19½	19½	..	19⅛	18¼	..	18¼	18¼	18¼	18¼	18⅛	..
Rolled Brown.....	17¾	17¾	17½	17½	17½	..	15	15	15	15	15	..	15	15	14¾	14⅝	14½	..	14½	14½	14½	14½	14⅜	..

New York Outside Market (Continued)

	August, 1940					
	19	20	21	22	23	24†
No. 1-X R.S.S. in cases*.....	19⅞	19⅞	19⅞	19⅝	19⅝	..
No. 1 Thin Latex Crepe.....	19⅝	19⅝	19⅝	19⅜	19⅜	..
No. 2 Thick Latex Crepe.....	19⅝	19⅝	19⅝	19⅜	19⅜	..
No. 1 Brown Crepe	18½	18½	18½	18¼	18¼	..
No. 2 Brown Crepe	18⅛	18⅛	18⅛	17⅞	17⅞	..
No. 2 Amber.....	18½	18½	18½	18¼	18¼	..
No. 3 Amber.....	18¼	18¼	18¼	17⅞	17⅞	..
Rolled Brown	14⅜	14⅜	14⅜	14⅛	14⅛	..

*No. 1 Ribbed Smoked Sheets are ⅛¢ lower than No 1-X R.S.S.in cases quoted here. †Closed.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	COMMODITY	CITY AND COUNTRY
†144	Wires and cables	Mecca, Saudi Arabia
†158	Tires and tubes.....	Mecca, Saudi Arabia
†200	Rubber heels	Baghdad, Iraq
†227	Rubber thread	Cairo, Egypt
†231 and †240	Canvas fire hose, unlined....	Brisbane, Australia
†264	Garters, suspenders	Manila, P. I.
†265	Elastic webbing	Manila, P. I.

† Purchase.

New York Outside Market

Activity in the outside market was reported generally quiet during the past month, with shipment business slow and factory business spotty. It was also reported that the Rubber Reserve Co. was buying quantities of rubber in the Far East. The market was easier, and the price of No. 1-X ribbed smoked sheets, packed in cases, which closed at 21¼¢ per pound on July 31, showed a gradual decline throughout August, to close at 19⅝¢ per pound on August 23. The closing price on August 29 was 19¼¢ per pound, with the market easier.

RUBBER SCRAP

THE demand for scrap rubber continued at a satisfactory level during August. Export business, however, was generally quiet. The market in general is easier, with all grades of mechanicals, except three, quoted lower, and with red tubes and solid truck tires also at lower levels. All other grades of scrap continue unchanged at last month's quotations.

Consumers' Buying Prices

(Carlot Lots for August 26, 1940)

		Prices
Boots and Shoes		
Boots and shoes, black	lb.	$0.01⅛/$0.01¼
Colored	lb.	.00⅞/ .01
Untrimmed arctics	lb.	.00⅞/ .01
Inner Tubes		
No. 1, floating	lb.	.10 / .10½
No. 2, compound	lb.	.04⅝/ .04¾
Red	lb.	.04¼/ .04½
Mixed tubes	lb.	.03⅞/ .04¼
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	ton	14.50 /15.50
Beadless	ton	18.00 /18.50
Auto tire carcass	ton	30.00 /35.00
Black auto peelings	ton	36.00 /37.00
Solid		
Clean mixed truck	ton	30.00 /32.00
Light gravity	ton	42.00 /44.00
Mechanicals		
Mixed black scrap	ton	20.00 /22.00
Hose, air brake	ton	18.00 /20.00
Garden, rubber covered	ton	10.00 /12.00
Steam and water, soft	ton	10.00 /12.00
No. 1 red	lb.	.02¾/ .03
No. 2 red	lb.	.02¼/ .02½
White druggists' sundries	lb.	.03¾/ .04
Mixed mechanicals	lb.	.02¼/ .02½
White mechanicals	lb.	.03¼/ .03½
Hard Rubber		
No. 1 hard rubber	lb.	.11½/ .13

A. C. S. Abstracts

(Continued from page 53)

molded. The main disadvantage is that, with the direct visual observation of amplitudes, the frequency must be low. The test has been useful in compound development and in factory control work. M. Mooney and R. H. Gerke, U. S. Rubber, Passaic, N. J.

Test Formulas for Reclaimed Rubber. The purpose of this paper is to show the desirability of replacing the reclaim-sulphur mix with compounded test formulas as a method of testing reclaimed rubber, and to make specific recommendations of test formulas which can be used. Tests obtained from the reclaim-sulphur mix are found to be much more erratic, from test to test of the same sample of reclaimed rubber, than tests obtained from compounded test recipes. Different samples of reclaimed rubber are shown to display equivalent results in compounded test formulas although they may vary widely when the reclaim-test is used.

Various types of accelerators which may be used in test formulas are discussed, and the combination of dibenzothiazyl dimethyl thiolurea (El Sixty) and diphenylguanidine is found to be satisfactory for most types of reclaimed rubber.

Specific recommendations of compounded test formulas for reclaimed rubber, to replace the reclaim-sulphur mix, are made. If the rubber and fillers in these test formulas are masterbatched, the test requires no more time and labor than the reclaim-sulphur mix.

It is concluded that the results of tests of reclaimed rubber in compounded test formulas are more consistent, and more indicative of the final performance of the reclaimed rubber, than the results of tests in the reclaim-sulphur mix. Henry F. Palmer and Robert H. Crossley, Xylos Rubber Co., Akron.

Determination of Free Carbon in Rubber: The Cresol Method. An analytical method is described for the determination of free carbon in either raw or vulcanized rubber mixes. It eliminates the use of hot concentrated nitric acid and possesses definite advantages over the nitric acid method in (a) accuracy, (b) speed, (c) safety, (d) application to raw stocks, and (e) fewer failures.

The method comprises, essentially, (a) digestion of the sample in hot cresol, followed by dilution in gasoline; (b) filtration of the solution of rubber through asbestos on a Gooch crucible to obtain the fillers, including free carbon; (c) the removal of soluble matter by washing with several solvents; (d) the removal of volatile matter by a short ignition in an atmosphere of carbon dioxide; (e) the final determination of free carbon by weighing, igniting in air, and determining the loss in weight. Modifications of the procedure necessary to avoid errors due to certain interfering substances are also given.

Data are presented showing the accuracy and precision of the method when applied to rubber mixes of accurately known free carbon contents. The method of preparation of these stocks is given. Data also are given on the effect of interfering substances which are occasionally encountered in rubber. Comparisons of results by the new method and by the nitric acid method are shown. The proper conditions of time and temperature for the hot cresol digestion are also shown, with data on the effects obtained by varying these conditions. J. B. Roberts, Jr., U. S. Rubber, Detroit.

Pliolite-Rubber Mixtures. Some fundamental differences between rubber and the cyclized rubber derivative known as Pliolite are given. The uses of Pliolite in rubber and of rubber in Pliolite are discussed. The technique of making these mixtures is shown, together with the compounding data and the physical properties of them. Mixtures of Pliolite with some of the synthetic, rubber-like materials are described. In the above mixtures, in general, Pliolite functions as a resilient stiffening, toughening compounding ingredient which analyzes chemically as rubber. Examples of the uses of these mixtures range from a flexible coating for cloth and silk through to the use as a tough, cutproof cover for golf balls and as a pure gum, thin-walled electrical insulator for wire. Herman R. Thies, Goodyear Tire & Rubber Co., Akron.

U. S. Crude and Waste Rubber Imports for 1940

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Totals 1940	Totals 1939	Balata	Miscellaneous	Waste
Jan. ..... tons	68,856	2,768	406	161	74	255	72,520	37,082	107	648	241
Feb.	40,338	1,758	553	453	30	256	43,088	31,038	75	316	34
Mar.	56,027	2,720	119	49	42	320	59,277	45,724	89	659	26
Apr.	66,688	3,219	374	97	12	309	70,699	32,031	63	581	8
May	47,321	2,883	729	186	24	288	51,431	45,886	150	596	204
June	50,785	2,365	267	146	1	325	53,889	34,363	83	494	20
July	66,955	1,586	494	139	54	246	69,474	37,372	152	345	7
Total 7 mos., 1940 ..... tons	396,970	16,999	2,942	1,231	237	1,999	420,378	.....	719	3,639	540
Total 7 mos., 1939 ..... tons	245,577	11,820	2,702	1,849	27	1,521	.....	263,496	435	4,735	919

Compiled from The Rubber Manufacturers Association, Inc., statistics.

B. W. Lewis, secretary, Chicago Group, Rubber Division, A. C. S., has notified us that the name of R. T. Vanderbilt Co. should have been included in the list of donors of prizes given at the Group's second annual outing (page 53, our August issue).

Uganda

Official statistics indicate increased value for raw rubber shipped from Uganda in recent years. In 1936 rubber exports were valued at £30,724, in 1937, £33,042, and in 1938, £36,673. The total area under *Hevea* was estimated at 10,813 acres at the end of 1938.

MICRONEX

Beads

HOW WELL DO THEY BREAK DOWN?

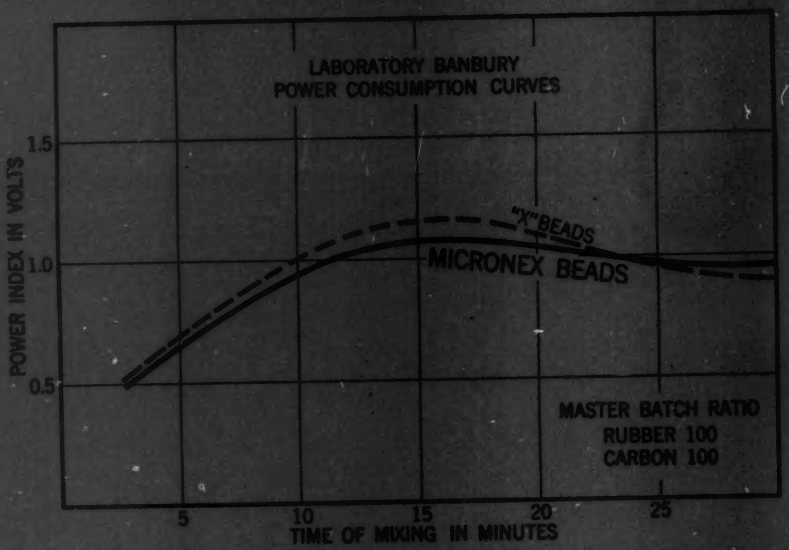
FOR THE ANSWER TURN THE PAGE...

COLUMBIAN CARBON CO.
MANUFACTURER

BINNEY & SMITH CO.
DISTRIBUTOR

41 EAST 42ND ST., NEW YORK, N. Y.

DIFFERENCES in despersing properties of carbon black beads are shown in the power consumption test as developed in our own laboratories. A comparison between Micronex Beads and a competitive product of equal particle size is shown in the following graph.



Conclusion: The power consumed (area under curves) for Micronex Beads is less than that of the competitive material. This indicates that Micronex Beads disperse more readily.

BINNEY & SMITH CO.
DISTRIBUTOR

•

COLUMBIAN CARBON CO.
MANUFACTURER

Binney & Smith
MASTER COLLOID

MICRONEX MEANS MORE MILEAGE

COMPOUNDING INGREDIENTS

DEMAND for rubber compounding ingredients during August was reported to be holding close to the somewhat reduced level of July. Increased activity was reported toward the latter part of the month, pointing toward an early fall pick-up in rubber manufacturing activity. September business is expected to reach a substantial volume. Prices in general are unchanged.

CARBON BLACK. The demand for black continued seasonally light during August, with indications of an early fall increase in activity. Export business during the summer was reported to have fallen off considerably. The price is steady.

Inventories in producers' hands as of August 1 were reported to be 138,000,000 pounds, an increase of 26,700,000 pounds from the preceding month.

FACTICE OF RUBBER SUBSTITUTE. The demand continued steady, with indications of increased fall activity. Prices in general are unchanged.

LITHARGE. The demand was quiet, and the price was reduced ¼¢ per pound. Later this was followed by an advance of 0.15¢ per pound.

LITHOPONE. Shipments were considered satisfactory, and the price is steady.

RUBBER CHEMICALS. Increased demand was noted at mid-month, and prices are generally steady.

RUBBER SOLVENTS. Volume during August was generally light, with increased activity noted toward the end of the month. The price is unchanged.

TITANIUM PIGMENTS. Although the market was somewhat quieter, the demand held to fairly satisfactory levels. The volume of business to date is estimated to be nearly 20% ahead of the comparable period last year. Prices are firm.

ZINC OXIDE. The demand held throughout the month to unexpectedly good levels, and shipments on contract were heavy. Prices continue firm and unchanged. Although zinc metal has advanced, it is unlikely that zinc oxide will change through the fourth quarter unless further advances in metal are made.

Current Quotations*

Abrasives

Pumicestone, powdered	lb.	$0.03 / $.035
Rottenstone, domestic	lb.	.03 / .035
Silica, 15	ton	

Accelerators, Inorganic

Lime, hydrated, *l.c.l.*, New York	ton	20.00
Litharge (commercial)	lb.	.075

Accelerators, Organic

A-1	lb.	.24 / .30
A-10	lb.	.31 / .35
A-11	lb.	.52 / .65
A-19	lb.	.52 / .65
A-32	lb.	.70 / .80
A-77	lb.	.42 / .55
A-100	lb.	.42 / .55
Accelerator 49	lb.	.40 / .42
737	lb.	.42 / .43
737-50	lb.	.25 / .26
808	lb.	.70 / .72
833	lb.	1.15
Acrin	lb.	.60
Aldehyde ammonia	lb.	.65 / .70
Altax	lb.	.55 / .60
B-J-F	lb.	.50 / .55
Beutene	lb.	.70 / .75
Butyl Eight	lb.	.98 / 1.00
Zimate	lb.	2.50
C-P-B	lb.	2.00
Captax	lb.	.50 / .55
Crylene	lb.	.40 / .47
Paste	lb.	.30 / .36
D-B-A	lb.	2.00
Delac A	lb.	.40 / .50
O	lb.	.40 / .50
P	lb.	.40 / .50
Di-Esterex-N	lb.	.60 / .70
DOTG (Di-ortho-tolyguanidine)	lb.	.44 / .46
DPG (Diphenylguanidine)	lb.	.35 / .36
El-Sixty	lb.	.50 / .65
Ethylideneaniline	lb.	.42 / .43
Ethyl Zimate	lb.	2.50
Formaldehyde P.A.C.	lb.	.06
Formaldehydeaniline	lb.	.31
Formaldehyde-para-toluidine	lb.	.52 / .54
Guantal	lb.	.40 / .50
Hepteen	lb.	.35 / .40
Base	lb.	1.35 / 1.50
Hexamethylenetetramine U.S.P.	lb.	.39
Technical	lb.	.33
Lead oleate, No. 999	lb.	$0.13
Witco	lb.	.15
Ledate	lb.	2.35
Monex	lb.	2.35
Novex	lb.	
O-N-V	lb.	1.00 /$1.10
O-X-A-F	lb.	.50 / .55
Ovac	lb.	.50 / .55
Para-nitroso-dimethylaniline	lb.	.85
Pentex	lb.	1.00 / 1.10
Flour	lb.	.15 / .16
Phenex	lb.	.50 / .55
Pip-Pip	lb.	2.50
Pipsolene	lb.	1.55 / 1.85
R-2	lb.	1.40 / 1.80
R-23	lb.	.40
R & H 50-D	lb.	.42 / .43
Rotax	lb.	.60 / .65
Safex	lb.	1.20 / 1.30
Santocure	lb.	.80 / 1.00
Selenac	lb.	2.75
SPDX	lb.	.70 / .75
A	lb.	.70 / .75
Super-sulphur No. 1	lb.	.50
2	lb.	.18 / .20
Tetrone A	lb.	2.70
Thiocarbanilide	lb.	.24 / .30
Thionex	lb.	2.35
Thiurad	lb.	2.35
Trimene	lb.	.55 / .65
Base	lb.	1.05 / 1.20
Triphenylguanidine (TPG)	lb.	.45
Tuads	lb.	2.35
Ulto	lb.	1.25 / 1.75
Ureka	lb.	.60 / .75
Blend B	lb.	.60 / .75
C	lb.	.56 / .65
Vulcanex	lb.	.42 / .43
Vulcanol	lb.	.85
Z-B-X	lb.	2.50
Zenite	lb.	.46 / .48
A	lb.	.53 / .55
B	lb.	.46 / .48
Zimate	lb.	2.35

Activators

Aero Ac 50	lb.	.46 / .56
Barak	lb.	.50
MODX	lb.	.30 / .35
SL No. 10	lb.	.11 / .14

Age Resisters

AgeRite Alba	lb.	1.50 / 1.65
Exel	lb.	1.00 / 1.02
Gel	lb.	.57 / .59
Hipar	lb.	.65 / .67
Powder	lb.	.52 / .54
AgeRite Resin	lb.	.52 / .54
D	lb.	.52 / .54
White	lb.	1.25 / 1.40
Akroflex C	lb.	.56 / .58
Albasan	lb.	.70 / .75
Aminox	lb.	.52 / .61
Antox	lb.	.56
B-L-E	lb.	.52 / .61
Powder	lb.	.65 / .74
B-X-A	lb.	$0.52 /$0.61
Copper Inhibitor X-872-A	lb.	1.15
Flectol B	lb.	.52 / .65
H	lb.	.52 / .65
White	lb.	.90 / 1.15
M-U-F	lb.	1.50
Neozone (standard)	lb.	.63
A	lb.	.52 / .54
B	lb.	.63
C	lb.	.52 / .54
D	lb.	.52 / .54
E	lb.	.63
Oxynone	lb.	.64 / .80
Parazone	lb.	.68
Permalux	lb.	1.20
Santoflex B	lb.	.52 / .65
Solux	lb.	1.30
Stabilite	lb.	.52 / .54
Alba	lb.	.70 / .75
Thermoflex A	lb.	.65 / .67
Tysonite	lb.	.16
V-G-B	lb.	.52 / .61

Alkalies

Caustic soda, flake, Columbia (400-*lb. drums*)	100 lbs.	2.70 / 3.55
liquid, 50%	100 lbs.	1.95
solid (700-*lb. drums*)	100 lbs.	2.30 / 3.15

Antiscorch Materials

A-F-B	lb.	.35 / .40
Antiscorch T	lb.	.90
Cumar RH	lb.	.10
E-S-E-N	lb.	.35 / .40
R-17 Resin (*drums*)	lb.	.10
RM	lb.	1.25
Retarder W	lb.	.36
Retardex	lb.	.45 / .48
U-T-B	lb.	.35 / .40

Antisun Materials

Heliozone	lb.	.22 / .23
S.C.R.	lb.	.33 / .35
Sunproof	lb.	.22 / .27

Brake Lining Saturant

B.R.T. No. 3	lb.	.0165/ .0175

Colors

Black

Du Pont powder	lb.	.42 / .44
Lampblack (commercial), *l.c.l.*	lb.	.15

Blue

Brilliant	lb.	
Du Pont dispersed	lb.	.83 / 3.95
Powders	lb.	2.25 / 3.75
Toners	lb.	.08 / 3.85

Brown

Mapico	lb.	.11

Green

Brilliant	lb.	
Chrome, light	lb.	
medium	lb.	.22
oxide (*freight allowed*)	lb.	
Dark	lb.	
Du Pont dispersed	lb.	.98 / 1.75
Powders	lb.	1.00 / 5.50
Guignet's (*bbls.*)	lb.	.70
Light	lb.	
Toners	lb.	.85 / 3.75

Orange

Du Pont dispersed	lb.	.88 / .98
Powders	lb.	.88 / 2.75
Lake	lb.	
Toners	lb.	.40 / 1.60

Orchid

Toners	lb.	1.50 / 2.00

Pink

Toners	lb.	1.50 / 2.00

Purple

Permanent	lb.	
Toners	lb.	.60 / 2.10

Red

Antimony Crimson, 15/17%	lb.	
R. M. P. No. 3	lb.	.48
Sulphur free R.M.P.	lb.	.52
Golden 15/17%	lb.	
7-A	lb.	.37
Z-2	lb.	.23
Cadmium, light (400-*lb. bbls.*)	lb.	.75 / .80
Chinese	lb.	
Crimson	lb.	
Du Pont dispersed	lb.	.93 / 2.05
Powders	lb.	.285 / .90
Mapico	lb.	.0925
Medium	lb.	
Rub-Er-Red (*bbls.*)	lb.	.0925
Scarlet	lb.	.08 / 2.00
Toners	lb.	.08 / 2.00

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing all known ingredients. Requests for information not recorded will receive prompt attention.

White

Lithopone (*bags*)	*lb.*	$0.0360/$0.0385
Albalith	*lb.*	.0360/ .0385
Astrolith (50-*lb. bags*)	*lb.*	**.0360/ .0385**
Azolith	*lb.*	.0360/ .0385
Cryptone-BA-19	*lb.*	.05 / .0525
BT	*lb.*	.05 / .0525
CB	*lb.*	.05 / .0525
ZS No. 20	*lb.*	.075 / .0775
36	*lb.*	.075 / .0775
230	*lb.*	.075 / .0775
800	*lb.*	
Sunolith	*lb.*	.0360/ .0385
Ray-Bar	*lb.*	.0525/ .0575
Ray-Cal	*lb.*	.05 / .0525
Rayox	*lb.*	.13
Titanolith (50-*lb. bags*)	*lb.*	.05 / .0525
Titanox-A (50-*lb. bags*)	***lb.***	**.13 / 1375**
B (50-*lb. bags*)	*lb.*	.0525/ .0550
30 (50-*lb. bags*)	*lb.*	.0525/ .0550
C (50-*lb. bags*)	*lb.*	.05 / .0525
M (50-*lb. bags*)	*lb.*	.0525/ .0550
Ti-Tone	*lb.*	
Zinc Oxide		
Azo ZZZ-11	*lb.*	.0625/ .0650
44	*lb.*	.0625/ .0650
55	*lb.*	.0625/ .0650
66	*lb.*	.0625/ .0650
French Process, Florence		
Green Seal-8	*lb.*	.08 / .0825
Red Seal-9	*lb.*	.075 / .0775
White Seal-7	*lb.*	.085 / .0875
Kadox, Black Label-15	*lb.*	.065 / .0675
No. 25	*lb.*	.075 / .0775
Red Label-17	*lb.*	.065 / .0675
Horse Head Special 3	*lb.*	.0625/ .065
XX Red-4	*lb.*	.0625/ .065
23	*lb.*	.0625/ .065
72	*lb.*	.0625/ .065
78	*lb.*	.0625/ .065
80	*lb.*	.0625/ .065
103	*lb.*	.0625/ .065
110	*lb.*	.0625/ .065
St. Toe (lead free)		
Black Label	*lb.*	.0625/ .065
Green Label	*lb.*	.0625/ .065
Red Label	*lb.*	.0625/ .065
U.S.P.	*lb.*	.095 / .0975
White Jack	*lb.*	.075 / .0775
Zopaque (50-*lb. bags*)	*lb.*	.13 / .135

Yellow

Cadmolith (cadmium yellow), (400-*lb. bbls.*)	*lb.*	.50 / .55
Du Pont dispersed	*lb.*	1.25 / 1.75
Powders	*lb.*	.135 / 2.75
Lemon	*lb.*	
Mapico	*lb.*	.0675
Toners	*lb.*	2.50

Dispersing Agents

Bardex	*lb.*	.0395/ .042
Bardol	*lb.*	.0225/ .045
Darvan	*lb.*	.30 / .39
Nevoll (*drums, c.l.*)	*lb.*	.0225
Santomerse S	*lb.*	.11 / .25

Fillers, Inert

Asbestine, *c.l.*	*ton*	15.00
Barytes	*ton*	30.00 /36.00
f.o.b., St. Louis (50-*lb. paper bags*)	*ton*	22.85
off color, domestic	*ton*	21.50 /26.50
white, imported	*ton*	
Blanc fixe, dry, precip.	*lb.*	.03 / .035
Calcene	*ton*	37.50 /43.00
Infusorial earth	*lb.*	.025 / .03
Kalite No. 1	*ton*	24.00 /30.00
3	*ton*	34.00 /40.00
Kalvan	*ton*	121.00
Magnesia, calcined, heavy	*lb.*	.04
Carbonate, *l.c.l.*	*lb.*	.0725/ .095
Paradene No. 2 (*drums*)	*lb.*	.045
Pyrax A	*ton*	6.00 /20.00
Whiting		
Columbia Filler	*ton*	9.00 /14.00
Suprex, white extra light	*ton*	45.00
heavy	*ton*	45.00
Witco, *c.l.*	*ton*	6.00

Finishes

Rubber lacquer, clear	*gal.*	
colored	*gal.*	
Starch, corn, pwd.	*100 lbs.*	
potato	*lb.*	
Talc	*ton*	.025 / .035

Flock

Cotton flock, dark	*lb.*	.09 / .11
dyed	*lb.*	.40 / .80
white	*lb.*	.11 / .20
Rayon flock, colored	*lb.*	.75 / 2.00
white	*lb.*	**.75 / 1.00**

Latex Compounding Ingredients

Accelerator 85	*lb.*	.35
89	*lb.*	1.40
122	*lb.*	1.55
552	*lb.*	2.50
Aerosol OT Aqueous 10%	*lb.*	.15 / .175
Antox, dispersed	*lb.*	.42
Aquarex A	*lb.*	.35
D	*lb.*	.75
F	*lb.*	.85
WA Paste	*lb.*	.28
Areskap No. 50	*lb.*	$0.18 /$0.24
100, dry	*lb.*	.39 / .51
Aresket No. 240	*lb.*	.16 / .22
300, dry	*lb.*	.42 / .50
Aresklene No. 375	*lb.*	.35 / .50
400, dry	*lb.*	.51 / .65
Black No. 25, dispersed	*lb.*	.22 / .40
Collocarb	*lb.*	.07
Color Pastes, dispersed	*lb.*	.35 / 1.90
Compound G-11 NW	*lb.*	
Dispersex No. 15	*lb.*	.11 / .12
No. 20	*lb.*	.08 / .10
Emo, brown	*lb.*	
white	*lb.*	
Factice Compound, dispersed	*lb.*	
Heliozone, dispersed	*lb.*	.25
Igepon A	*lb.*	
Latac	*lb.*	
MICRONEX, Colloidal	*lb.*	.055 / .0655
Nekal BX (dry)	*lb.*	
Pipsol X	*lb.*	3.05 / 3.55
R-2 Crystals	*lb.*	2.50 / 2.75
R-23	*lb.*	.40
RN-2	*lb.*	2.00 / 2.25
Crystals	*lb.*	2.00 / 2.25
S-1 (400-*lb. drums*)	*lb.*	.65
Santobrite Briquettes	*lb.*	.17 / .26
Powder	*lb.*	.16 / .26
Santomerse D	*lb.*	.41 / .65
S	*lb.*	.11 / .25
No. 1	*lb.*	.18 / .35
No. 2	*lb.*	.18 / .35
No. 3	*lb.*	.40 / .65
No. 3P	*lb.*	.29 / .45
Santovar A	*lb.*	1.15 / 1.40
Stablex A	*lb.*	.90 / 1.10
B	*lb.*	.65 / .90
C	*lb.*	.40 / .50
Sulphur, dispersed	*lb.*	.10 / .15
No. 2	*lb.*	.075
T-1 (400-*lb. drums*)	*lb.*	.40
Tepidone	*lb.*	1.20
Vulcan Colors	*lb.*	
Zinc oxide, dispersed	*lb.*	.12 / .15

Mineral Rubber

Black Diamond	*ton*	25.00
B.R.C. No. 20	*lb.*	.009 / .01
Hydrocarbon, hard	*ton*	23.00
Genasco Hydrocarbon, granulated	*ton*	
solid	*ton*	
Gilsonite	*ton*	
Parmr	*ton*	
Pioneer	*ton*	
285°-300°	*ton*	23.00 /42.00

Mold Lubricants

Lubrex	*lb.*	.25 / .30
Mold Paste	*lb.*	.12 / .18
Sericite	*ton*	65.00 /75.00
Soapbark	*lb.*	
Soapstone, *l.c.l.*	*ton*	25.00 /35.00

Oil Resistant

AXF	*lb.*	.40 / .50

Reclaiming Oils

B.R.V.	*lb.*	.032 / .0345
No. 1621	*lb.*	.019 / .02
S.R.O.	*lb.*	.019 / .02
X-159	*gal.*	.20

Reenforcers

Carbon Black		
Aerfloted Arrow Specification (*bags only*)	*lb.*	.02925†
Arrow Compact Granulized	*lb.*	.02925†
Certified Heavy Compressed (*bags only*)	*lb.*	.02925†
Spheron	*lb.*	.02925†
Continental, dustless	*lb.*	.02925†
Compressed (*bags only*)	*lb.*	.02925†
Disperso	*lb.*	.02925†
Dixie	*lb.*	.02925†
Dixiedensed	*lb.*	.02925†
66	*lb.*	.02925†
Excello, dustless	*lb.*	.02925†
Fumonex	*lb.*	.03
Gastex	*lb.*	.03 / .07
Kosmobile	*lb.*	.02925†
66	*lb.*	.02925†
Kosmos	*lb.*	.02925†
MICRONEX Beads	*lb.*	.02925†
Mark II	*lb.*	.02925†
Standard	*lb.*	.02925†
W-5	*lb.*	.02925†
W-6	*lb.*	.02925†
P-33	*lb.*	.0475 / .0725
Pelletex	*lb.*	.03 / .07
Supreme, dustless	*lb.*	.02925†
Thermax	*lb.*	.02 / .0475
Velvetex	*lb.*	.029 / .034
"WYEX BLACK"	*lb.*	.02925†
Carbonex	*lb.*	.022 / .035
S	*lb.*	.03 / .0350

†Price quoted is f.o.b. works (bags). The price f.o.b. works (bulk) is 2.75¢ per pound; f.o.b. Hoboken (bulk), 3.63¢; f.o.b. No. Atlantic Docks (bags), 3.80¢. All prices are carlot.

Clays		
Aerfloted Paragon (50-*lb. bags*)	*ton*	$10.00
Suprex (50-*lb. bags*)	*ton*	10.00
Barden	*ton*	10.00
Catalpo, *c.l.*	*ton*	30.00
Chicora	*ton*	10.00
China	*ton*	
Crown	*ton*	10.00
Dixie	*ton*	10.00 /$22.50
Hi-White	*ton*	10.00
Langford	*ton*	8.50
NcNamee	*ton*	10.00 /22.50
Par	*ton*	10.00
Paraforce, *c.l.*	*ton*	40.00
Witco, *c.l.*	*ton*	10.00
Cumar EX	*lb.*	.045
MH	*lb.*	.065 / .11
V	*lb.*	.09 / .12
Silene	*lb.*	.04 / .045

Reodorants

Amora A	*lb.*	
B	*lb.*	
C	*lb.*	
D	*lb.*	
Compound G-4	*lb.*	
G-11	*lb.*	
Curodex 19	*lb.*	2.75
188	*lb.*	3.50
Para-Dors	*lb.*	4.50
Rodo No. 0	*lb.*	3.50 / 4.00
10	*lb.*	4.50 / 5.00
198	*lb.*	

Rubber Substitutes

Black	*lb.*	.08 / .12
Brown	*lb.*	.08 / .115
White	*lb.*	.085 / .135
Factice		
Amberex	*lb.*	.25
Type B	*lb.*	.1875
Brown	*lb.*	.08 / .12
Fac-Cel B	*lb.*	.13
C	*lb.*	.13
Neophax A	*lb.*	.09
B	*lb.*	.089
White	*lb.*	.08 / .12

Softeners

B.R.T. No. 7	*lb.*	.0165/ .0175
Bondogen	*lb.*	.98 / 1.25
Burgundy pitch	*lb*	.06
Cycline oil	*gal.*	.14 / .20
Dispersing Oil No. 10	*lb.*	.0335/ .036
Nuba resinous pitch (*drums*)		
Grades No. 1 and No. 2	*lb.*	.0265
Nubalene Resin	*lb.*	.025
Palm oil (Witco), *c.l.*	*lb.*	
Palmol	*lb.*	
Para Flux	*gal.*	.085 / .18
No. 2016	*gal.*	.15 / .20
Para Lube	*lb*	.425 / .48
Pine tar	*gal.*	
Plastogen	*lb.*	.0775/ .10
Plastone	*lb.*	.27 / .30
R-19 Resin (*drums*)	*lb.*	.10
21 Resin (*drums*)	*lb.*	.10
Reogen	*lb.*	.115 / .22
Rosin oil, compounded	*gal.*	.40
RPA No. 1	*lb.*	.65
2	*lb.*	.65
3	*lb.*	.46
Rubtack	*lb.*	.10
Tackol	*lb.*	.085 / .18
Tonox	*lb.*	.52 / .61
Tonox D	*lb.*	.75 / .85
Witco No. 20, *l.c.l.*	*gal.*	.20
X-1 resinous oil (*tank car*)	*lb.*	.01

Softeners for Hard Rubber Compounding

Resin C. Pitch 45°C. M.P.	*lb.*	.013 / .014
60°C. M.P.	*lb.*	.013 / .014
75°C. M.P.	*lb.*	.013 / .014

Solvents

Beta-Trichlorethane	*gal.*	
Carbon bisulphide	*lb.*	
tetrachloride	*lb.*	
Cosol No. 1	*gal.*	.25 / .30
No. 2	*gal.*	.20 / .28
No. 3	*gal.*	.20 / .28
Industrial 90% benzol (*tank car*)	*gal.*	.14
Skellysolve	*gal.*	

Stabilizers for Cure

Laurex (*bags*)	*lb.*	.1025/ .1275
Stearex B	*lb.*	.085 / .095
Beads	*lb.*	.08 / .09
Stearic acid, single pressed	*lb.*	.085 / .095
Stearite, *c.l.*	*100 lbs.*	8.00
Zinc stearate	*lb.*	.23 / .25

Synthetic Rubber

Neoprene Type E	*lb.*	.65
G	*lb.*	.70
GN	*lb.*	
GW	*lb.*	.75
H	*lb.*	.78
M	*lb.*	.65
Latex Type 57	*lb.*	.30
Synthetic 100	*lb.*	55

(*Continued on page 88*)

40% LATEX

60% LATEX

REVERTEX

73-75% CONCENTRATED

Compounds tailored to your special requirements

Technical Service is at your Disposal without charge or obligation

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REVERTEX CORPORATION OF AMERICA

1 MAIN STREET **BROOKLYN, N. Y.**

TO PRODUCERS OF RUBBER FOOTWEAR

We are exclusive manufacturers of the Patten Air Lift Motor driven machine for cutting taps and soles from sheet rubber. This machine will cut from 3,500 to 5,000 pairs per day, producing a sole or tap with beveled edge of 27° to 90°, and is an up-to-date type of machine for this purpose.

We are now placing in the hands of our customers a new type of the above machine to which we have given the name of "Heavy Duty" designed to meet the demand for a machine capable of cutting thicker stock in Sole and Heel; using a 2 H.P. motor and a larger cylinder and piston which increase the pressure 80%. A taper clutch adds greatly to the power produced, and an improved blade gives better results in cutting the heavier stock. Although designed for heavy service, this machine is equally successful in cutting thinner stock for light shoes.

We are in position to make delivery of either type within thirty days after receipt of order.

WELLMAN COMPANY

Machinists

MEDFORD, MASS., U. S. A.

Regular and Special Constructions

of

COTTON FABRICS

Single Filling **Double Filling**

and

ARMY

Ducks

HOSE and BELTING

Ducks

Drills

Selected

Osnaburgs

Curran & Barry

320 BROADWAY

NEW YORK

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	June 29	July 27	Aug. 3	Aug. 10	Aug. 17	Aug. 24
July ..	10.42	....	....	....	....	....
Aug...	10.17	9.54	9.56	9.45	....	....
Sept...	9.19	9.39	9.41	9.30	9.19	9.19
Dec. ..	9.04	9.26	9.28	9.27	9.15	9.16
Mar. ..	8.77	9.03	9.08	9.13	9.03	9.06
June ..	....	8.76	8.78	8.85	8.75	8.79
July ..	....	8.67	8.69	8.77	8.65	8.69

New York Quotations

August 26, 1940

Drills		
38-inch 2.00-yard	yd.	$0.11
40-inch 3.47-yard		.06¾
50-inch 1.52-yard		.15¼
52-inch 1.85-yard		.15⅜
52-inch 1.90-yard		.12⅝
52-inch 2.20-yard		.11¼
52-inch 2.50-yard		.09⅞
59-inch 1.85-yard		.13
Ducks		
38-inch 2.00-yard D. F.	yd.	.10⅞/.12½
40-inch 1.45-yard S. F.		.15¼
51½-inch 1.35-yard D. F.		.18½
72-inch 1.05-yard D. F.		.25/.16¼
72-inch 17.21-ounce		.27½
Mechanicals		
Hose and belting	lb.	.24¾
Tennis		
52-inch 1.35-yard	yd.	.16½
Hollands		
Gold Seal and Eagle		
20-inch No. 72	yd.	.10
30-inch No. 72		.18
40-inch No. 72		.20
Red Seal and Cardinal		
20-inch	yd.	.08½
30-inch		.15¼
40-inch		.17
50-inch		.26
Osnaburgs		
40-inch 2.34-yard	yd.	.09¼
40-inch 2.48-yard		.08¾
40-inch 2.56-yard		.08⅜
40-inch 3.00-yard		.07⅛
40-inch 7-ounce part waste		.08
40-inch 10-ounce part waste		.10½
37-inch 2.42-yard		.09
Raincoat Fabrics		
Cotton		
Bombazine 60 x 64	yd.	.07½
Plaids 60 x 48		.10¾
Surface prints 60 x 64		.11¾
Print cloth, 38½-inch, 60 x 64		.04¾
Sheetings, 40-Inch		
48 x 48, 2.50-yard	yd.	.07⅞
64 x 68, 3.15-yard		.07¾
56 x 60, 3.60-yard		.06¾
44 x 40, 4.25-yard		.04⅞
Sheetings, 36-Inch		
48 x 48, 5.00-yard	yd.	.04⅜
44 x 40, 6.15-yard		.03½
Tire Fabrics		
Builder		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.30
Chafer		
14 ounce 60" 20/8 ply Karded peeler	lb.	.29½
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.29
Cord Fabrics		
23/5/3 Karded peeler, 1 1/16" cotton	lb.	.30½
15/3/3 Karded peeler, 1 1/16" cotton	lb.	.28½
12/4/2 Karded peeler, 1 1/16" cotton	lb.	.27½
23/5/3 Karded peeler, 1¼" cotton	lb.	.36
23/5/3 Combed Egyptian	lb.	.49½
Leno Breaker		
8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.32

WHILE cotton futures prices in the distant months ruled firm, nearby months and the spot position lost ground during August. The New York ⅞-inch spot middling price, after closing at 10.39¢ per pound on July 31, declined throughout August to close at 9.89¢ per pound on August 24. Thereafter the market was steady and the closing price on August 29 was 9.89¢ per pound.

According to the Bureau of Census, the cotton carryover on July 31, the end of the 1939-40 crop year, totaled 10,595,720 bales, against 13,032,513 a year ago. With consumption in July totaling 597,850 bales, use for the 12-month period was 7,745,574 bales, compared with 6,858,426 in the previous year. Exports of domestic cotton totaled 6,175,349 bales, against only 3,326,840 in the previous year.

On August 8 the Crop Reporting Board of the Department of Agriculture estimated production of cotton from this season's crop at 11,429,000 bales, or 388,000 bales less than the 11,817,000 bales grown last season.

The Department of Agriculture on August 9 announced a loan rate on cotton from the 1940 crop season of 9.80¢ per pound for middling ⅞-inch staple at all Gulf and Pacific Coast ports on a net weight basis, with the loan elsewhere varying according to location from a 9.16¢ level in west Texas and Oklahoma to 9.90¢ in Carolina mill areas. The loan rates are 21 to 35 points higher than last season's rates and are based on ⅞-inch cotton instead of the ⅞-inch of last season.

Fabrics

After a brief spurt in activity at the beginning of last month, the market for fabrics turned dull. This period of inactivity ended when large orders for defense requirements started to come in toward the latter part of August. A continued broadening of demand, especially for fabrics adapted to war purposes, is anticipated for September.

The market is mainly steady with quotations showing a mixed trend. A strengthening of the price structure is expected to accompany the anticipated heavier demand for fabrics.

IMPORTS, CONSUMPTION, AND STOCKS

THE R. M. A. estimated that United States rubber manufacturers consumed 47,011 long tons of crude rubber during July, 1.1% over the June consumption of 46,506 long tons and 4.5% above the July, 1939, figure of 44,975 (revised) long tons.

Gross imports for July, as reported by the Department of Commerce, were 69,474 long tons, an increase of 28.9% over the June figure of 53,889 long tons and 85.9% over the 37,372 long tons imported in July, 1939.

Total domestic stocks, as estimated by the Association, on July 31, were 190,222 long tons, 13.1% over the 168,235 long tons on hand June 30 and 15% over the 165,450 (revised) long tons on hand July 31, 1939.

Crude rubber afloat to U. S. ports on July 31 is estimated at 139,629 long tons, against 119,138 long tons reported afloat on June 30 and 52,990 long tons afloat July 31, 1939.

The figure for U. S. stocks on July 31 includes 32,437 long tons of government emergency rubber.

United States Latex Imports

Year	Pounds (d.r.c.)	Value
1938	26,606,048	$ 4,147,318
1939	61,460,003	10,467,552
1940		
Jan.	7,639,568	1,412,728
Feb.	4,862,684	947,524
Mar.	7,561,780	1,473,056
Apr.	8,430,063	1,608,156
May	8,029,276	1,523,879
June	5,490,018	1,004,007

Data from Leather and Rubber Division, Washington, D. C.

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks—Long Tons

Twelve Months	U.S. Imports*	U.S. Consumption¶	U.S. Stocks Mfrs., Dealers, Importers, Etc.†¶	U.S. Stocks Afloat	U.K.—Public Warehouses, London, Liverpool†‡	Singapore and Penang Dealers and Port Stocks†‡	World Production (Net Exports)‡	World Consumption Estimated‡	World Stocks†‡§
1937	584,851	543,600	262,204	63,099	57,785	44,792	1,139,800	1,105,002	646,252
1938	400,178	437,031	231,500	45,105	86,853	27,084	894,900	942,252	596,498
1939	499,473	592,000	125,800	91,095	44,917*a*	15,299	1,004,119	1,104,858	447,666*a*
1940									
Jan.	72,496	54,978	142,368*b*	90,285*b*	.....	35,928	108,710	97,970	.....
Feb.	43,088	49,832	134,328*b*	112,257*b*	.....	33,563	113,991	95,575	.....
Mar.	59,258	50,192	142,414*b*	113,619*b*	.....	23,830	112,301	93,006	.....
Apr.	70,699	50,103	162,459*b*	102,557*b*	.....	42,239	88,814	98,714	.....
May	51,431	51,619	161,446*b*	109,364*b*	.....	32,770	123,046	97,967	.....
June	53,889	46,506	168,235*b*	119,138*b*	.....	32,411	111,056	82,051	.....
July	69,474	47,011	190,222	139,629*b*	.....	.....	.....	.....	.....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡*Statistical Bulletin of the International Rubber Regulation Committee.* §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, regulated areas, and afloat. ¶Corrected to 100% from estimate of reported coverage. *a.* Stocks as of Aug. 31, 1939. *b.* Includes government barter rubber.

Out in the Orient, many natives still do their weaving on looms as primitive as this one. Thousands of years have made little or no impression on these crude facilities simply because the skill of trained textile engineers is lacking. In contrast, our organization, representing twenty modern mills, has at its disposal a large and competent staff of textile engineers which keeps our tremendous production running at a high degree of efficiency. We are, therefore able to offer the finest of industrial fabrics at regular market prices.

FOR INSTANCE: *Belting Duck*

BELTING DUCK

Our belting ducks deliver satisfactory performance because their construction has been based on scientific data accumulated by our engineers through the operation of our belt clinic where all causes of mechanical failure are carefully checked and analyzed.

WELLINGTON SEARS COMPANY

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FINANCIAL

Unless otherwise stated, the results of operations of the following companies are after deductions for operating expenses, normal federal income taxes, depreciation, and other charges, but before provision for federal surtax on undistributed earnings. Most of the figures are subject to final adjustments.

American Cyanamid Co., New York, N. Y., and subsidiaries. First half, 1940: net profit, $3,024,128, after depreciation, depletion, research, and process development expenses, interest, amortization, federal income taxes, and other charges, equal to $1.11 each on the 2,618,365 shares of $10 par combined Class A and B common stocks, after allowing for preferred dividend requirements, contracted with $2,149,714, or 80¢ each on 2,618,369 combined common shares in the first half last year.

American Zinc Lead, & Smelting Co., Columbus, O., and wholly owned subsidiaries. June quarter: net profit, $174,040, equal after dividend requirements on $5 and $6 preferred stocks, to 13¢ each on 673,088 common shares, against $79,600, or $1.17 each on 67,953 shares of $5 prior preferred stock, in the March quarter and $41,384, or 62¢ each on 68,553 shares of $5 prior preferred stock, in the second quarter of 1939. Year ended June 30: net profit, $487,119, or 21¢ a common share, against $84,519, of $1.27 a share on $5 prior preferred stock, for the year to June 30, 1939.

Baldwin Rubber Co., Pontiac, Mich. Nine months to June 30: net profit, $402,167, equal to $1.27 each on 316,754 shares of common stock, against $305,890, or 96¢ a share in the nine months to June 30, 1939. The company has changed its fiscal year to end June 30, instead of September 30.

Barber Asphalt Corp., New York, N. Y., First half, 1940: net profit, $100,464, equal to 25¢ each on 390,223 shares of capital stock, compared against $1,003, or less than 1¢ a share, last year. Year ended June 30; net profit, $643,893, or $1.65 a share, against net loss of $61,691 in the preceding year.

Columbian Carbon Co., New York, N. Y., and subsidiaries. First half, 1940: net profit, $1,858,281, equal to $3.46 each on 537,406 common shares, against $1,633,599, or $3.04 a share, last year.

Dewey & Almy Chemical Co., Cambridge, Mass. First half, 1940: net income, $272,773, equal to $1.02 each on 216,475 shares of common stock, against $247,906, or $1 each on 191,775 shares of common stock, in the first half of 1939.

Dow Chemical Co., Midland, Mich., and subsidiaries. Year ended May 31, 1940: net profit, $7,159,167, after federal income taxes, all charges, and preferred dividend requirements, equal to $6.65 each on 1,031,998 shares of no par common, against $4,178,485, or $3.76 a common share, in the previous fiscal year; sales, $37,743,467, against $26,762,282.

Flintkote Co., New York, N. Y., and subsidiaries. Twenty-eight weeks to July 13: net income, $621,470, equal to 92¢ each on 678,546 shares outstanding, against $610,331, or 91¢ each, on 672,996 shares for last year's period; net sales, $9,163,272, against $8,339,828. Sixteen weeks to July 13: net income, $507,152, or 75¢ a share, against $507,837, or 75¢ a share, in the same weeks of 1939; net sales, $6,032,388, against $5,489,711. Fifty-two weeks to July 13: net income, $1,443,522, or $2.13 a share, against $1,152,522, or $1.71 a share, in corresponding period of previous year; net sales, $17,987,591 against $16,188,179.

General Motors Corp., Detroit, Mich. June quarter: consolidated net income, $46,546,999, after all charges and taxes, provision for special contingency reserve and for other unusual items, totaling $26,700,000, and after preferred dividend requirements, equal to $1.02 each on the 43,500,000 common shares outstanding, against $47,814,603, or $1.06 a common share, in the second quarter of 1939. First half, 1940: net income, $113,575,460, or $2.52 a common share, against $100,992,531, or $2.24 a common share, in the same period last year.

Goodyear Tire & Rubber Co., Akron, O., and subsidiaries. First half, 1940: consolidated net profit, $4,142,892 after depreciation, interest, dividends, and equity in undistributed earnings of subsidiaries not wholly-owned, federal income taxes, including heavy retroactive war taxes on certain foreign subsidiaries, and other charges, equal after dividend requirements on 646,532 shares of $5 preferred stock, to $1.23 each on 2,059,168 shares of no par common stock, excluding shares in the treasury, contrasted with $3,610,595, or 96¢ a common share, in the same period last year; net sales, $101,055,607, against $95,756,419.

Intercontinental Rubber Co., New York, N. Y., and subsidiaries. First half, 1940: net income, $157,590.74, against $96,966.72 in the first six months last year.

Jenkins Bros., Bridgeport, Conn. First half, 1940: net income, $92,671, against $42,984 last year.

National Lead Co., New York, N. Y. First half, 1940: consolidated net profit, $2,119,810, after federal income taxes and all charges, equal, after preferred A and B dividend requirements, to 69¢ each on 3,095,100 shares of $10 par common stock, excluding 3,210 shares held as an investment, contrasted with 3,017,957, or 66¢ a common share in the same period of 1939; sales $41,455,769, against $35,916,259.

New Jersey Zinc Co., New York, N. Y. First half, 1940: net profit, $3,318,268 after taxes, depreciation, depletion, contingencies and other charges, equal to $1.69 each on the 1,963,264 shares of capital stock, against $2,047,648, or $1.04 a share, in the first half of 1939. June quarter: net profit, $1,553,156, or 79¢ a share, against $1,765,112, or 90¢ a share, in the first quarter of 1940 and $971,382, or 49¢ a share, in the June quarter of 1939.

Phelps Dodge Corp., New York, N. Y., and subsidiaries. First half, 1940: net profit, $5,804,538 after interest, amortization, depreciation, federal and state income taxes, and other charges, but before depletion, equal to $1.14 each on the 5,071,260 shares of $25 par capital stock, against $4,601,038, or 91¢ a share, in the first half of 1939; sales, $38,542,969, against $34,912,984.

Skelly Oil Co., Tulsa, Okla., and subsidiaries. June quarter: net profit, $771,680 after all charges, equal to 74¢ each on 995,348 shares of common stock, against $517,838, or 42¢ a share, for the June quarter last year. First half, 1940: net income, $1,544,961, equal to $1.42 a common share, against net income of $756,918, or 57¢ a share, for the same period last year. Year ended June 30: net income, $3,148,827, equal to $2.85 a share, against $2,128,731, or $1.75 a share, for the 12 months ended on June 30, 1939.

United States Rubber Co., New York, N. Y. First half, 1940: consolidated net income, $4,234,239, after all charges, taxes, reserves, and a loss of $437,345 on the sale of its former general office building, equal, after preferred dividends, to 94¢ each on 1,736,092 common shares, contrasted with $4,465,397, or $1.18 a common share, in the first half of 1939; net sales for first half of 1940, $109,782,572 (the best in any similar period in the last 21 years), against $88,349,048; direct taxes, $12,644,000, including federal income taxes, $1,436,599, against $1,033,496, foreign income taxes, $847,330, against $25,605 (included in 1940 foreign income tax, $165,432 for war defense taxes assessed this year retroactively against 1939 income by the Netherland India government), federal excise tax on tires and tubes, $6,916,000, social security taxes, $1,220,000; current assets, June 30, 1940, $111,591,451, current liabilities, $33,722,720, against $105,170,153 and $30,710,116, respectively, on December 31; cash, $10,174,215, against $14,426,772; inventories at lower cost or market, $63,327,359, against $60,973,436; consolidated earnings of plantations, first half, 1940, $1,029,788; assets in foreign countries, $36,387,352; total assets, $186,213,609, against $182,295,401. (All known losses in foreign countries have been taken into account in this report.)

(*Continued on page* 88)

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge.*

SITUATIONS WANTED

TECHNOLOGIST, 20 YEARS OF PRACTICAL EXPERIENCE IN rubber, neoprene, Perbunan, cork and wood flour, gaskets, flooring, etc., compounding and factory practices. Address Box No. 134, care of INDIA RUBBER WORLD.

YOUNG MAN WITH ABILITY AND EXCELLENT KNOWLEDGE of mechanical rubber goods seeks an opportunity where sales, jobbing and purchasing experience are an assurance of a position with a future. Address Box No. 136, care of INDIA RUBBER WORLD.

CHEMIST WITH VARIED EXPERIENCE IN RUBBER LABORATories, covering analysis, compounding and preparation of specimens, testing and reclaiming. Also the processing and evaluation of mineral fillers, including their photomicrography. Address Box No. 137, care of INDIA RUBBER WORLD.

CHEMIST, 15 YEARS' EXPERIENCE COMPOUNDING, ENGINEERing, and supervision for tires, tubes, mechanicals, and adhesives. Address Box No. 142, care of INDIA RUBBER WORLD.

ORGANIC CHEMIST, M.S., M.I.T., SIXTEEN YEARS IN RESearch, Development, and Production. Intimate knowledge of latex sponge processes. Good diversified background in Organic and Inorganic Chemistry. Excellent references. Available immediately. Address Box No. 143, care of INDIA RUBBER WORLD.

FOSTER D. SNELL, INC.

Our staff of chemists, engineers and bacteriologists with laboratories for analysis, research, physical testing and bacteriology are prepared to render you *Every Form of Chemical Service*

305 Washington Street **Brooklyn, N. Y.**

INTERNATIONAL PULP CO.

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SOLE PRODUCERS

ASBESTINE

REG. U. S. PAT. OFF.

Compounding Ingredients for Rubber

by the Editors of

INDIA RUBBER WORLD

$2.50 Postpaid in U. S. A. **$2.75 Elsewhere**

SITUATIONS OPEN

POSITION OPEN FOR PATTERN MAKER ON RUBber and fabric footwear. Address Box No. 133, care of INDIA RUBBER WORLD.

DRAFTSMAN - ENGINEER. FAMILIAR RUBBER MACHINERY. Electrical and hydraulic experience desired, but not essential. Give full details, education, references, experience, age. Address Box No. 138, care of INDIA RUBBER WORLD.

WANTED: RUBBER CHEMIST WITH THREE TO SIX YEARS' compounding experience. Knowledge of heel and sole compounding is preferred. Must have ability to manage small laboratory and handle men. Address Box No. 139, care of INDIA RUBBER WORLD.

EXPERIENCED RUBBER COMPOUNDER WITH TECHNICAL background, if possible, for position in Metropolitan District. Prefer man with background of experience in quarterlinings, both plain and lacquered. Give full details in first letter. Address Box No. 144, care of INDIA RUBBER WORLD.

WANTED: PRODUCTION SUPERINTENDENT, PREFERABLY college graduate holding degree of Mechanical or Chemical Engineer with 5 to 10 years of experience in manufacture of mechanical rubber goods. Excellent opportunity for the man who can produce. Address Box No. 145, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITY

AN INTEREST IN A SMALL PLANT MANUFACTURING HARD and Soft Rubber Specialties may be secured by a party having practical experience and capital. Write only if seriously interested. Address Box No. 148, care of INDIA RUBBER WORLD.

CARBON FILLER OXIDE

Manufactured in standard and superfine grades for use in all hard and semi-hard rubber products such as heels, soles, battery boxes, mechanical goods, etc.

We have served the trade directly for years. Samples and technical advice free.

M. E. WALLACE CO., SUNBURY, PA.

WORKS, WALLACE, NORTHUMBERLAND COUNTY, PA.

MECHANICAL MOLDED RUBBER GOODS

Sponge Rubber: Sheeted—Die Cut—Molded

We Solicit Your Inquiries

THE BARR RUBBER PRODUCTS COMPANY

SANDUSKY, OHIO

COMPLETE RUBBER PRODUCTION UNITS

For Sale or Lease, Near Boston, Mass.

MILL AND CALENDER DEPARTMENT including No. 9 Banbury Mixer, large and small mills, crackers, and calenders—all in immediate operating condition. Production capacity about 20-30 tons daily.

This would make an ideal moulded goods unit with addition of presses. Department includes about 20,000 square feet of space—more if required.

COMPLETE UNIT FOR MANUFACTURE OF RUBBER FABRICS including impregnating, spreading and curing. Department includes about 16,000 square feet of space—more if required.

COMPLETE UNIT FOR MANUFACTURE OF RUBBER FOOTWEAR SPECIALTIES. Occupies about 30,000 square feet of space—more if required.

A WELL EQUIPPED MACHINE SHOP. Details will be supplied on request.

Address Box No. 141, care of INDIA RUBBER WORLD.

(Advertisements continued on page 89)

RECLAIMED RUBBER

ACCORDING to R. M. A. figures, July reclaimed rubber consumption is estimated at 14,298 long tons, 9.8% below that of June; production, 14,342 long tons; and stocks on hand July 31, 28,058 long tons. The decrease in reclaim consumption was contrary to the trend in crude rubber consumption, which showed a slight increase in the same period. Demand during August was reported to be slightly better than that of July. The early production of 1941 automobile models is said to be stimulating the demand for reclaim, particularly for mechanical goods items. The insulated wire business is also continuing active as a consumer for reclaim.

The market is steady, and all grades of reclaim continue at last month's quotations.

New York Quotations

August 26, 1940

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6 / 6¼
Acid	1.18-1.22	7 / 7¼
Shoe		
Standard	1.56-1.60	6½/ 6¾
Tubes		
Red Tube	1.15-1.30	9 / 9¼
Compound	1.10-1.20	9 /10
Miscellaneous		
Mechanical Blends	1.25-1.50	4½/ 5
White	1.35-1.50	12½/14

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

United States Reclaimed Rubber Statistics—Long Tons

Year	Production†	Consumption†	Consumption % of Crude	U. S. Stocks*†	Exports
1938	122,403	120,800	27.6	23,000	7,403
1939	186,000	170,000	28.7	25,250	12,611
1940					
Jan.	19,297	16,070	29.2	27,418	1,059
Feb.	17,992	15,370	30.8	28,602	1,436
Mar.	17,234	15,931	31.7	28,488	1,420
Apr.	16,568	16,298	32.5	27,558	977
May	17,552	15,719	30.5	28,397	866
June	16,631	15,844	34.1	28,327	1,207
July	14,342	14,298	30.4	28,058	.....

*Stocks on hand the last of the month or year. †Corrected to 100% from estimate of reported coverage. *Compiled by The Rubber Manufacturers Association, Inc.*

Financial

(*Continued from page* 86)

Thermoid Co., Trenton, N. J., and domestic subsidiary. First half, 1940: net profit, $274,090, equal, after dividend requirements on 39,956 shares of $10 par $3 convertible preferred stock on which is an accumulation of unpaid dividends, to 45¢ each on 476,388 shares of $1 par common stock, against $168,733, or 23¢ a common share, last year. June quarter: net profit, $138,882, or 23¢ a common share, against $135,208, or 22¢ a share, in the March quarter and $103,583, or 15¢ a share, in the June quarter last year.

Current Quotations

(*Continued from page* 82)

Tackifier

B.R.H. No. 2 ..... *lb.* $0.017 /$0.02

Varnish

Shoe ..... *gal.* 1.45

Vulcanizing Ingredients

Sulphur ..... 100 *lbs.* 2.00
Chloride (*drums*) ..... *lb.* .035 / .04
Telloy ..... *lb.* 1.75
Vandex ..... *lb.* 1.75
(See also Colors—Antimony)

Waxes

Carnauba, No. 3 chalky .... *lb.*
2 N.C. ..... *lb.*
3 N.C. ..... *lb.*
1 Yellow ..... *lb.*
2 ..... *lb.*
Montan, crude ..... *lb.*

World Net Imports of Crude Rubber—Long Tons

Year	U.S.A.	U.K.†	Argentine	Australia	Belgium	Canada	France	Greater Germany‡	Italy	Japan	Poland	Sweden	U.S.S.R.	Rest of World	Total
1938	406,300	168,172	7,700	12,300	11,300	25,700	58,100	107,900	28,200	46,300	7,900	8,300	26,800	49,200	928,000
1939	486,348	70,800¶	9,552	15,426	9,593	32,508	33,751§	62,344§	12,582§	42,351	5,415§	7,965a	14,000*	61,866	603,842¶
1940															
Jan.	71,541	....	1,049	921	891	5,047	....	....	....	4,547	....	....	....	....	....
Feb.	41,797	....	565	1,846	694	3,508	....	....	....	5,243	....	....	....	....	....
Mar.	58,283	....	756	1,784	....	3,062	....	....	....	6,057	....	....	....	....	....
Apr.	70,135	....	606	1,612	....	3,096	....	....	....	....	....	....	....	....	....
May	50,621	....	....	....	....	3,108	....	....	....	....	....	....	....	....	....

*Estimated, and to Aug. 31, 1939, only. †U. K. figures show gross imports, not net imports. ‡Including imports of Austria and Czechoslovakia. ¶Up to Aug. 31, 1939, only §Up to July 31, 1939, only. aUp to Sept. 30, 1939. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Shipments of Crude Rubber from Producing Countries—Long Tons

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Thailand	French Indo-China	Total	Philippines and Oceania	Liberia†	Other Africa	South America	Mexican Guayule	Grand Total
1938	372,000	298,100	49,500	8,500	6,700	9,500	17,800	41,600	59,200	862,900	2,000*	2,900	9,000*	15,300	2,800	894,900
1939	376,755	372,046	61,028	9,241	6,616	11,864	24,014	41,266	65,219	968,049	2,080*	5,435	9,600*	16,094	2,861	1,004,119
1939																
Jan.	24,393	38,680	7,237	764	1,115	1,604	2,342	2,918	4,532	83,585	220	528	800	1,812	347	87,292
Feb.	29,278	24,996	5,495	947	618	664	1,484	5,606	5,293	74,381	158	435	800	1,187	319	77,280
Mar.	29,238	27,933	3,718	773	619	344	1,177	5,401	4,501	73,764	230	427	800	1,407	210	76,838
Apr.	29,779	28,338	2,225	881	379	1,687	2,446	2,660	2,657	71,052	135	533	800	1,206	167	73,893
May	29,598	24,429	2,805	1,002	668	558	1,649	2,782	4,584	68,075	129	...	800	1,077	231	70,312
June	22,052	27,510	3,707	630	805	332	1,157	1,748	4,663	62,604	140	667	800	676	166	65,053
July	26,013	35,679	5,019	782	503	1,603	3,092	5,599	3,367	81,657	190	516	800	1,071	264	84,498
Aug.	40,973	27,477	5,620	203	213	975	1,749	5,230	7,020	89,460	234	222	800	1,313	378	92,407
Sept.	26,908	37,755	6,064	691	89	429	1,932	4,670	5,943	84,481	94	599	800	1,356	46	87,376
Oct.	49,458	44,998	5,234	665	150	1,730	2,487	2,047	5,022	111,791	122	561	800	1,524	356	115,154
Nov.	35,773	30,334	4,402	370	449	1,322	2,023	1,428	6,540	82,641	254	614	800	1,198	137	85,644
Dec.	33,232	23,917	9,502	1,533	1,008	616	2,476	1,177	11,097	84,558	174	333	800	2,267	240	88,372
1940																
Jan.	26,229	54,148	7,698	839	833	1,858	2,256	5,722	5,238	104,821	120	1,191	900	1,550	128†	108,710
Feb.	45,651	37,958	8,946	2,017	892	1,164	2,678	4,307	6,931	110,544	94	477	900	1,662	314†	113,991
Mar.	47,885	42,407	5,305	1,122	87	1,050	3,526	3,111	3,551	108,828	178	548	900	1,482	365†	112,301
Apr.	25,454	44,357	4,148	1,183*	990	1,799	2,951	1,834	2,927	85,643	200*	598	900	1,159	314†	88,814
May	57,874	40,221	7,341	1,183*	1,046	1,370	2,696	2,582	4,578	118,891	150*	600*	900	2,305	200*	123,046
June	45,471	44,750	5,603	1,184*	712	1,421	4,077	2,178	2,730	108,126	150*	600*	900	1,080	200*	111,056

* Estimated. †Guayule rubber imports into U.S.A. provisional until export figures from Mexico are received. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Classified Advertisements

Continued

MACHINERY AND SUPPLIES FOR SALE

CONSOLIDATED OFFERS: Battery of Semi-Automatic Presses, 75 to 400 ton, complete with pull-backs and ejectors; 60" Mixing Rolls; 66" 3-roll Calender; 7-Gould Triplex Hydraulic Pumps, 3-1500 PSI, 35 GPM, 4-3000 PSI, 18 GPM; 2-Watson-Stillman 4-cylinder opposed Hydraulic Pumps, 6000 lb. PSI, 25 GPM, motor driven, 100 HP AC motors; Watson-Stillman Hydro-Pneumatic Accumulator, 8" ram, 48" stroke, 42" air cylinder, 5000 lb. PSI, complete with high-pressure air receiver and inter-connecting fittings. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, N. Y. C.

FOR SALE: ONE COMPLETELY REBUILT NUMber 9 Banbury Mixer. All vital parts restored and hard-surfaced. Ready for immediate shipment complete with motor, control, all accessories, etc. INTERSTATE WELDING SERVICE, 914 Miami St., Akron, Ohio.

MACHINERY AND SUPPLIES WANTED

WANTED FOR USER: 1—NO. 3 OR NO. 9 BANBURY MIXER; 3—Mills; 1—Calender; 5—Hydraulic Presses, with pumps and accumulators; 2—Tubers. No dealers. Address Box No. 135, care of INDIA RUBBER WORLD.

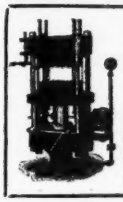
WANTED BY USER FOR CASH: ONE NO. 9 OR 11 BANBURY Mixer, 4 Mills, 1 Calender, 3 Rolls friction and even speed, 6 Hydraulic Presses with Pumps and Accumulator, 3 Tubers, Molds for Heels. No Dealers. Address Box No. 140, care of INDIA RUBBER WORLD.

WANTED: ENGRAVED SHEETING CALENDER FRONT ROW changeable suitable for shoe production, also shoe vulcanizer with quick-closing door. No dealers. Address Box No. 146, care of INDIA RUBBER WORLD.

WANTED: USED MOLDS, IN GOOD CONDITION, FOR RUBBER washers, stoppers, plumbers' sundries, dolls, balls, bicycle accessories. Address Box No. 147, care of INDIA RUBBER WORLD.

SPECIALIZING IN **USED MACHINERY** FOR THE **RUBBER** AND ALLIED INDUSTRIES

ERIC BONWITT — AKRON, OHIO



PLASTICS MOLDING PRESSES

Plain or Semi-automatic—Any Size or pressure—Pumps, Valves, etc.

Dunning & Boschert Press Co., Inc.

336 W. WATER ST. SYRACUSE, N. Y.

New Rubber Spreaders, Churns, Pony Mixers, Saturators.

Used — Rebuilt — Rubber — Chemical — and Paint Machinery.

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STOCK SHELLS HOSE POLES

MANDRELS

NATIONAL SHERARDIZING & MACHINE CO.

868 WINDSOR ST. HARTFORD, CONN.

Representatives

Akron San Francisco New York

GUAYULE RUBBER

Washed and Dry, Ready for Compounding

PLANTATION RUBBER

From Our Own Estates in Sumatra

CONTINENTAL RUBBER COMPANY OF NEW YORK

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GUARANTEED REBUILT MACHINERY

IMMEDIATE DELIVERIES FROM STOCK

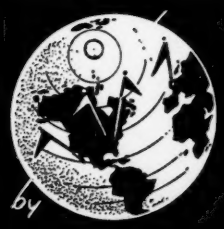
MILLS, CALENDERS, TUBERS
VULCANIZERS, ACCUMULATORS

HYD. PRESSES, PUMPS, MIXERS
CUTTING MACHINES, PULVERIZERS

UNITED RUBBER MACHINERY EXCHANGE

319-323 FRELINGHUYSEN AVE. CABLE "URME" NEWARK, N. J.

World Wide Service



The World's Largest Rebuilder of Rubber Mill Machinery!

FACTORY REBUILT and GUARANTEED RUBBER MILL MACHINERY

Accumulators	Mills	Churns	Spreaders
Calenders	Pumps	Motors	Vulcanizers
Cutting Machines	Mixers	Presses	Tubers

"Equipped to Furnish Complete Plants"

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AND MOLDS FOR RUBBER SPECIALTIES AND MECHANICAL GOODS

machined in a large modern shop at low prices by specialists in the field. We also build special machinery to your drawings.

Submit inquiries for low quotations.

THE AKRON EQUIPMENT CO.
AKRON - OHIO

RUBBER CUTTING SPECIALISTS

BOTH STANDARD AND SPECIAL EQUIPMENT FOR THE RUBBER INDUSTRY

IF IT CAN BE CUT WE CAN CUT IT

SEND US YOUR INQUIRIES

FINE BR TOOLS

BLACK ROCK MANUFACTURING COMPANY

Eastern Representatives for the Schuster Magnetic Gauge
175 Osborne Street Bridgeport, Conn.
Export Office: 305 Broadway, New York, N. Y.

Rubber Trade Inquiries

The inquiries below are of interest not only in showing the needs of the trade, but because additional information may be furnished by readers. The Editor is glad to have those interested communicate with him.

No.	Inquiry
2777	Manufacturer of molded rubber handle for knives.
2778	Manufacturer of rubber pipe conveyer system.
2779	Manufacturers of rubber raincapes.
2780	Manufacturers of rubber toys.
2781	Manufacturers of bulbs for syringes, less than one ounce.
2782	Manufacturer of the rubber accelerator "Z.Superac."
2783	Suppliers of pure vermilion.
2784	Manufacturers of rubber cement for adhering rubber compounds to metals.
2785	Manufacturer of "Elastico" rubber sewing thread.
2786	Manufacturers of crude rubber washers.
2787	Manufacturers of rubber sponge for use as a swab in bottles of liquid deodorants.
2788	Manufacturers of forms to keep fabric gloves stretched out during dipping and drying of a coating operation.
2789	Manufacturers of rings to seal fruit cans.

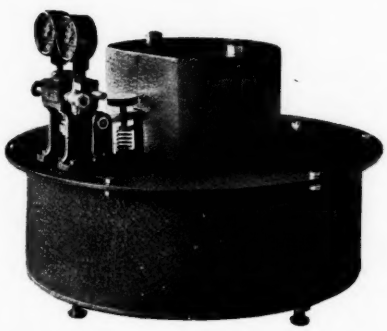
Imports by Customs Districts

	June, 1940		June, 1939	
	*Crude Rubber		*Crude Rubber	
	Pounds	Value	Pounds	Value
Maine and New Hampshire	.....	.....	78,448	$13,248
Massachusetts	8,479,435	$1,509,172	11,332,444	1,830,893
New York	81,547,708	14,397,845	47,221,660	7,508,975
Philadelphia	1,814,117	292,725	1,202,800	194,725
Maryland	9,890,495	1,658,380	1,880,292	272,850
Georgia	.....	.....	669,863	97,395
Mobile	60,480	9,557	4,368,930	606,775
New Orleans	3,897,390	672,118	3,769,129	575,738
Galveston	112,739	20,032	67,200	10,390
El Paso	99,600	8,625	89,600	8,798
San Antonio	88,000	9,892	.....	.....
Los Angeles	13,839,656	2,365,082	5,727,930	913,005
San Francisco	769,055	135,149	369,730	56,576
Ohio	531	103	.....	.....
Oregon	.....	.....	16,800	2,662
Colorado	112,000	19,865	179,200	25,862
Totals	120,711,206	$21,098,545	76,973,966	$12,117,892

*Crude rubber including latex dry rubber content.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Armstrong Cork Co.	Com.	$0.25	Sept. 3	Aug. 5
Armstrong Cork Co.	Pfd.	$1.00 q.	Sept. 16	Sept. 3
Belden Mfg. Co.	Com.	$0.25	Sept. 2	Aug. 17
Boston Woven Hose & Rubber Co.	Com.	$0.50	Nov. 25	Nov. 15
Boston Woven Hose & Rubber Co.	Com.	$1.00 spec'l	Aug. 23	Aug. 22
Brunswick-Balke-Collender Co.	Com.	$1.00 irreg.	Sept. 16	Sept. 5
Brunswick-Balke-Collender Co.	Pfd.	$1.25 q.	Oct. 1	Sept. 20
Canada Wire & Cable Co., Ltd.	Com.	$0.25 interim	Sept. 15	Aug. 31
Canada Wire & Cable Co., Ltd.	Pfd.	$1.625 q.	Sept. 15	Aug. 31
Collins & Aikman Corp.	Com.	$0.25	Sept. 3	Aug. 20
Collins & Aikman Corp.	Pfd.	$1.25 q.	Sept. 3	Aug. 20
Crown Cork & Seal, Ltd.	Com.	$0.50	Aug. 15	Aug. 10
Dayton Rubber Mfg. Co.	Com.	$0.25	Aug. 15	Aug. 3
Detroit Gasket & Mfg. Co.	Pfd.	$0.30 q.	Sept. 2	Aug. 15
Dominion Textile Co., Ltd.	Com.	$1.25 q.	Oct. 1	Sept. 14
Dominion Textile Co., Ltd.	Pfd.	$1.75 q.	Oct. 15	Sept. 30
E. I. du Pont de Nemours Co., Inc.	Com.	$1.75	Sept. 14	Aug. 26
E. I. du Pont de Nemours Co., Inc.	Com.	$1.125 q.	Oct. 25	Oct. 10
Faultless Rubber Co.	Com.	$0.25 q.	Oct. 1	Sept. 12
Firestone Tire & Rubber Co.	Pfd.	$1.50 q.	Sept. 1	Aug. 15
General Motors Corp.	Com.	$1.00 irreg.	Sept. 12	Aug. 15
General Motors Corp.	Pfd.	$1.25 q.	Nov. 1	Oct. 7
B. F. Goodrich Co.	Pfd.	$1.25 q.	Sept. 30	Sept. 18
Goodyear Tire & Rubber Co.	Com.	$0.25	Sept. 16	Aug. 15
Goodyear Tire & Rubber Co.	5% Pfd.	$1.25 q.	Sept. 16	Aug. 15
Hewitt Tire & Rubber Co.	Com.	$0.25	Sept. 14	Aug. 30
Okonite Co.	Com.	$1.50 irreg.	Aug. 1	July 23
Okonite Co.	6% Pfd.	$1.50 q.	Sept. 3	Aug. 20
Pharis Tire & Rubber Co.	Com.	$0.15	Sept. 20	Sept. 5
Plymouth Rubber Co.	Pfd.	$1.75 q.	July 15	July 1
Plymouth Rubber Co.	Pfd.	$1.75 q.	Oct. 15	Oct. 1
Rayestos-Manhattan, Inc.	Com.	$0.25	Sept. 16	Aug. 30
Russell Mfg. Co.	Com.	$0.25 initial	Sept. 16	Aug. 31
Thermoid Co.	Pfd.	$1.00	Sept. 16	Aug. 30
United Elastic Corp.	Com.	$0.15	Sept. 24	Sept. 5
United States Rubber Co.	8% Pfd.	$2.00 q.	Sept. 27	Sept. 13
Westinghouse Electric & Mfg. Co.	7% Part. Pfd.	$0.125	Aug. 30	Aug. 13
Westinghouse Electric & Mfg. Co.	Com.	$1.00 increased	Aug. 30	Aug. 13



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A simplified, rugged and super-sensitive control of remarkable accuracy. Available for either vacuum or pressure control with a working range from zero to two and one-half inches of water head. In actual tests under normal working conditions this controller consistently controls within one one-hundredth inch of pressure or vacuum.

Momentary violent variations of pressure or vacuum are instantly reduced in effectiveness by the inner damping cylinder which puts the instrument in proper operating position.

The overall dimensions are smaller than most competitive instruments but nothing has been sacrificed which would make for more effective control. Only one simple adjustment controls the operation of this instrument throughout its entire range.

Single Adjustment—
Trouble-free Mechanisms—
Ball Bearing Guides and Pivots—
Leakless Air Valves—
Great Sensitivity—
Modest Price—

SEELY INSTRUMENT CO., INC. **AKRON, OHIO**

ROBERT BADENHOP CORPORATION

CRUDE RUBBER

GUTTA PERCHA
LIQUID LATEX

GUTTA SIAK
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WOOLWORTH BLDG. (TEL. CORTLAND 7-6920) NEW YORK, N.Y.

QUALITY **INTEGRITY** **SERVICE**

59 YEARS WITHOUT REORGANIZATION

BELTING

Transmission—Conveyor—Elevator

HOSE

for every purpose
Water—Fire—Air—Steam

HOME RUBBER CO. TRENTON, N. J. STEAM NEVER BURN BLOW OUT. PACKING. CHICAGO NEW YORK

PACKING

Sheet & Rod Packings
for every condition

Mechanical Specialties of Every Description

HOME RUBBER COMPANY

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The New General Dual 8

The

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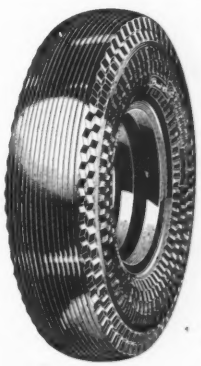
TIRE

- goes a long way to make friends

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE & RUBBER CO.



The General Dual 10

AN APPROVED CLAY

CROWN CLAY

SOUTHEASTERN CLAY COMPANY
AIKEN, SOUTH CAROLINA

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FLEXO JOINTS
Reasonable in price—extremely low maintenance cost
FLEXO SUPPLY COMPANY, 4218 Olive Street, St. Louis

BROCKTON TOOL COMPANY
Central Street
QUALITY MOULDS FOR ALL PURPOSES
South Easton, Mass.
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"BRAKE LININGS" VOLUME I OF THE BRAKE LIBRARY, By T. R. STENBERG
A comprehensive cyclopedia of the history and construction of brake linings of all types—how to select materials and avoid failures and troubles—based on actual experience and extensive research and presented in simple and comprehensive language. 91 pages, 8½ x 11 inches, indexed.
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INDIA RUBBER WORLD
420 Lexington Ave., New York, N. Y.

Rims Approved and Branded by Tire & Rim Association

Size	Six Mos., 1940 Number	%
Drop Center Rims, 16" Diameter and Under		
15x3.00D	35,243	0.4
15x4.50E	131,597	1.5
15x5.00E	681	0.0
15x5.00F	87,661	1.0
15x5.50F	95,562	1.1
16x3.00D	6,856	0.1
16x3.50D	134,921	1.6
16x4.00E	4,829,178	56.7
16x4.25E	556,220	6.5
16x4.50E	1,784,186	21.0
16x5.00F	771,376	9.0
16x5.50F	8,614	0.1
16x6.00F	9,517	0.1
Drop Center Rims, 16" Diameter and Under, Low Flange		
All Sizes	1,166	0.0
Drop Center Rims, 17" Diameter and Over		
All Sizes	70,206	0.8
Flat Base Rims for Balloon Tires		
All Sizes	3,647	0.0
Clincher Rims		
All Sizes	1,502	0.0
15" Truck and Bus Rims		
15x7	3,518	0.2
15x8	2,394	0.1
15x9/10	46	0.0
17" Truck and Bus Rims		
17x5	26,692	1.5
17x6	48,932	2.8
17x7	382	0.0
18" Truck and Bus Rims		
18x5	2,768	0.2
18x6	1,464	0.1
18x7	8,261	0.5
18x8	19,809	1.1
18x9/10	702	0.0
19" Truck and Bus Rims		
19x11	3,327	0.2
20" Truck and Bus Rims		
20x5	255,931	14.8
20x6	687,704	39.8
20x7	389,173	22.5
20x8	121,783	7.0
20x9/10	14,962	0.9
20x11	1,895	0.1

Size	Six Mos., 1940 Number	%
22" Truck and Bus Rims		
22x7	143	0.0
22x8	9,887	0.6
22x9/10	8,203	0.5
24" Truck and Bus Rims		
24x6	6,107	0.4
24x7	4,645	0.3
24x8	5,055	0.3
24x9/10	7,797	0.5
24x11	1,478	0.1
Semi-Drop Center Rims, 16" for Light Trucks		
16x4.50E	18,937	1.1
16x5.50F	76,374	4.4
Drop Center Tractor and Implement Rims		
12x2.50C	4,273	0.8
12x3.00D	9,601	1.9
13x5.50F	9,095	1.8
15x2.50C	17	0.0
15x3.00D	56,456	11.1
16x3.00D	7,687	1.5
18x2.50C	1,695	0.3
18x3.00D	958	0.2
18x5.50F	8,021	1.6
19x3.00D	56,938	11.3
20x4.50E	6,764	1.3
20x5.50F	8,484	1.7
21x3.00D	1,394	0.3
21x3.25E	3,054	0.6
22x4.50E	7,997	1.6
24x3.00D	418	0.1
30x3.00D	220	0.0
36x3.00D	1,112	0.2
36x4.50E	1,452	0.3
40x3.00D	474	0.1
24x5.50R	3,555	0.7
32x5.50R	96	0.0
36x5.50R	639	0.1
40x5.50R	1,340	0.3
20x8.00T	1,210	0.2
24x6.00S	6,025	1.2
24x8.00T	32,969	6.5
28x6.00S	1,320	0.3
28x8.00T	22,224	4.4
32x8.00T	7,107	1.4
36x6.00S	15,997	3.2
36x8.00T	28,153	5.6
40x6.00S	6,118	1.2
40x8.00T	786	0.2
42x8.00T	89	0.0
W7-24	21,529	4.3
W8-24	37,654	7.4
W10-24	78	0.0
W6-28	6.37	0.1
W8-28	28	0.0
W9-28	5,448	1.1
W10-28	15,015	3.0
W11-28	408	0.1
W6-32	10,827	2.1
W7-32	13,387	2.6
W8-32	2,290	0.4
W11-32	465	0.1
W6-36	488	0.1
W7-36	2,184	0.4
W8-36	3,234	0.6
W9-36	2,628	0.5
W10-36	8,698	1.7
W7-38	4,317	0.8
W8-38	7,205	1.4
W9-38	6,140	1.2
W10-38	1,756	0.3
W4-40	462	0.1
W4.5-40	599	0.1
W8-40	281	0.0
W10-40	1,840	0.4
W5-44	399	0.1
W6-44	1,957	0.4
DW11-24	473	0.1
DW10-26	1,768	0.3
DW11-26	350	0.1
DW11-28	2,017	0.4
DW11-30	98	0.0
DW12-30	113	0.0
DW11-32	270	0.1
DW9-36	1,574	0.3
DW10-36	1,049	0.2
DW11-36	1,847	0.4
DW7-38	193	0.0
DW8-38	7,007	1.4
DW9-38	13,142	2.6
DW10-38	10,327	2.0
DW11-38	2,374	0.5
Cast Rims		
10x5.00F	604	50.0
10x6.00F	234	19.3
20x11.25Y	2	0.2
24x10	7	0.6
24x11.25Y	9	0.7
24x13Y	91	7.5
24x15Y	240	19.9
32x17	10	0.8
32x18	10	0.8
40x15	2	0.2
Airplane Rims		
All Sizes	1,135	0.0
Totals	10,765,140	...

Stamford Neophax Vulcanized Oil

(Reg. U. S. Pat. Off.)

For Use with Neoprene

THE STAMFORD RUBBER SUPPLY CO. STAMFORD CONN.

Makers of Stamford Factice Vulcanized Oil

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NORMAL and CONCENTRATED

Agents in U. S. A. for Dunlop Concentrated 60% Latex, Product of Dunlop Malayan Estates, Ltd.

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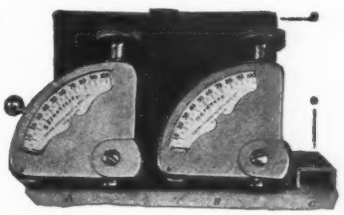
An International Standard of Measurement for—

Hardness • Elasticity • Plasticity of Rubber, etc.

Is the DUROMETER and ELASTOMETER (23rd year)



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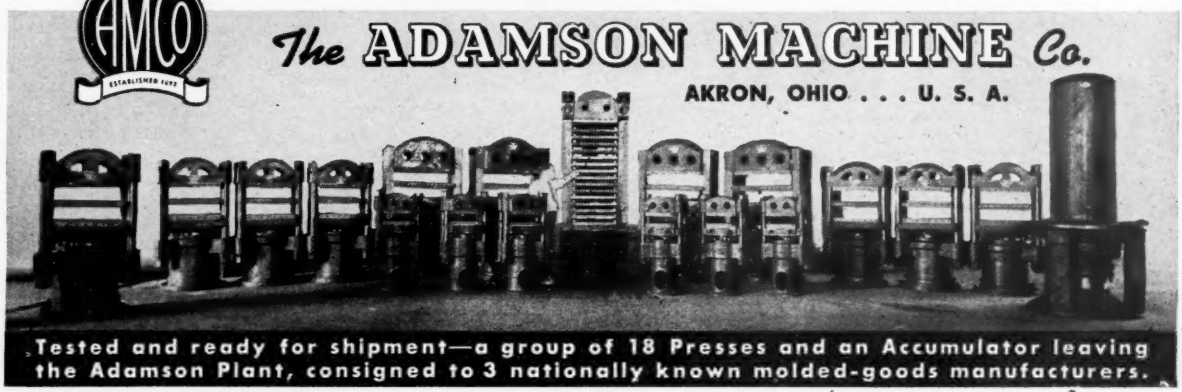
It is economic extravagance to be without these instruments. Used free handed in any position or on Bench Stands, convenient, instant registrations, fool proof. *Ask for our Descriptive Bulletins, and Price List R-4 and R-5.*

THE SHORE INSTRUMENT & MFG. CO.
Van Wyck Avenue and Carll Street, JAMAICA, NEW YORK
Agents in all foreign countries.

THE WORLD'S FINEST RUBBER MACHINERY . . . .

The ADAMSON MACHINE Co.

AKRON, OHIO . . . U. S. A.



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EVERY USER OF OR DEALER IN

RUBBER

SHOULD RECEIVE REGULARLY THE MONTHLY

STATISTICAL BULLETIN

OF THE

INTERNATIONAL RUBBER REGULATION COMMITTEE

LONDON, ENGLAND

Containing Complete Information Regarding Quotas, Production, Absorption, Stocks and Prices—Vital Information to Everyone Dealing in or Using Rubber.

$2.50 Per Year

25 cents per copy

Address orders to

INDIA RUBBER WORLD

AUTHORIZED DISTRIBUTORS IN THE UNITED STATES

420 Lexington Ave. New York, N. Y.

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	May, 1940 Quantity	May, 1940 Value	Five Months Ended May, 1940 Quantity	Five Months Ended May, 1940 Value
UNMANUFACTURED—*Free*				
Liquid latex (solids).....*lb.*	7,780,983	$1,479,402	36,371,801	$6,920,866
Jelutong or pontianak....*lb.*	1,109,562	158,713	5,858,736	787,718
Balata .....*lb.*	133,740	20,503	546,336	105,585
Gutta percha .....*lb.*	251,703	64,286	2,022,952	307,639
Guayule .....*lb.*	644,200	57,578	3,154,600	302,224
Scrap and reclaimed.....*lb.*	633,483	11,630	3,507,010	60,416
Totals	10,553,671	$1,792,112	54,616,035	$8,484,448
Misc. rubber (above), 1,000 *lbs.*	10,554	$1,792,112	54,616	$8,484,448
Crude rubber.....1,000 *lbs.*	106,781	18,556,432	625,788	108,471,181
Totals .....1,000 *lbs.*	117,335	$20,348,544	680,404	$116,955,629
Chicle, crude .....*lb.*	2,306,087	751,202	6,226,993	2,019,880
MANUFACTURED—*Dutiable*				
Rubber tires .....*no.*	1,989	$8,574	27,801	$174,847
Rubber boots, shoes and overshoes .....*prs.*	12,555	4,543	27,660	7,616
Rubber soled footwear with fabric uppers .....*prs.*	120,668	22,844	449,616	78,940
Golf balls .....*no.*	98,224	9,819	360,630	33,202
Lawn tennis balls.....*no.*	199,305	19,946	780,885	74,867
Other rubber balls.....*no.*	142,948	4,749	1,021,344	36,879
Other rubber toys.....*lb.*	.....	2,825	.....	14,720
Hard rubber combs.....*no.*	.....	.....	.....	.....
Other manufactures of hard rubber	.....	226	.....	8,717
Friction or insulating tape.*lb.*	4,119	2,543	28,619	18,640
Belts, hose, packing, and insulating material	.....	4,138	.....	37,219
Druggists' sundries of soft rubber	.....	3,924	.....	22,704
Inflatable swimming belts, floats, etc. .....*no.*	19,776	1,889	420,007	28,130
Other rubber and gutta percha manufactures	.....	13,733	.....	159,066
Totals	.....	$99,753	.....	$695,547

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber .....*lb.*	1,839,604	$301,914	10,319,625	$2,049,504
Balata .....*lb.*	3,685	1,476	242,095	76,152
Other rubber, rubber substitutes and scrap.....*lb.*	25,060	3,508	159,816	21,990
Rubber manufactures (including toys)	.....	3,970	.....	24,845
Totals	.....	$310,868	.....	$2,172,491

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed .....*lb.*	1,939,965	$107,502	12,897,033	$670,296
Scrap .....*lb.*	5,425,330	106,033	35,197,643	677,096
Cements .....*gal.*	40,256	45,711	203,334	251,889
Rubberized auto cloth.*sq. yd.*	17,894	8,910	97,266	46,011
Other rubberized piece goods and hospital sheeting.*sq. yd.*	208,115	74,997	940,752	334,606
Boots .....*prs.*	6,210	12,907	68,935	144,093
Shoes .....*prs.*	18,188	13,828	114,356	67,925
Canvas shoes with rubber soles .....*prs.*	90,445	74,494	245,216	195,173
Soles .....*doz. prs.*	3,419	9,121	21,219	41,915
Heels .....*doz. prs.*	22,766	13,350	130,313	76,328
Soling and top lift sheets.*lb.*	49,826	11,711	406,108	76,135
Gloves and mittens..*doz. prs.*	8,014	22,352	54,062	125,935
Water bottles and fountain syringes .....*no.*	26,615	9,890	130,362	44,442
Other druggists' sundries...	.....	75,568	.....	357,580
Gum rubber clothing....*doz.*	22,026	50,136	97,039	243,535
Balloons .....*gross*	16,378	13,095	94,003	83,938
Toys and balls	.....	14,641	.....	51,263
Bathing caps .....*doz.*	3,988	6,544	28,009	47,901
Bands .....*lbs.*	15,236	6,914	101,980	49,861
Erasers .....*lb.*	28,660	16,417	129,315	75,556
Hard rubber goods				
Electrical battery boxes.*no.*	12,652	9,680	107,055	76,775
Other electrical.....*lb.*	28,678	9,214	242,135	100,462
Combs, finished .....*doz.*	19,967	11,871	97,857	52,392
Other hard rubber goods...	.....	19,463	.....	73,809
Tires				
Truck and bus casings.*no.*	37,664	759,991	164,504	3,397,623
Other auto casings....*no.*	39,806	437,905	244,313	2,682,917
Tubes, auto .....*no.*	65,900	124,473	291,586	537,497
Other casings and tubes.*no.*	9,845	85,354	42,818	363,022
Solid tires for automobiles and motor trucks....*no.*	812	15,028	2,644	53,345
Other solid tires.....*lb.*	20,115	4,558	91,327	18,342
Tire sundries and repair materials .....*lb.*	305,056	79,287	1,249,526	351,996
Rubber and friction tape..*lb.*	64,324	20,803	371,156	105,316
Fan belts for automobiles.*lb.*	28,556	14,044	195,544	106,650
Other rubber and balata belts .....*lb.*	207,655	120,693	1,508,411	787,304
Garden hose .....*lb.*	55,848	11,310	371,056	65,650
Other hose and tubing....*lb.*	420,587	179,358	3,144,435	1,281,474
Packing .....*lb.*	115,770	64,949	588,996	296,045
Mats, matting, flooring, and tiling .....*lb.*	73,295	10,261	470,997	63,611
Thread .....*lb.*	77,784	59,042	470,532	333,036
Gutta percha manufactures.*lb.*	45,758	18,480	892,586	262,554
Latex (d.r.c.) and rubber sheets processed for further manufacture.....*lb.*	167,792	77,067	616,314	178,636
Other rubber manufactures..	.....	272,671	.....	1,117,896
Totals	.....	$3,009,621	.....	$15,967,836

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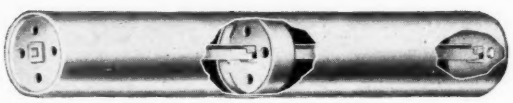

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